USER'S GUIDE TO COMPUTER-AIDED TRANSCRIPTION

National Institute of Law Enforcement and Criminal Justice
Law Enforcement Assistance Administration
United States Department of Justice

USER'S GUIDE
TO
COMPUTER-AIDED TRANSCRIPTION

by

J. Michael Greenwood
Jerry R. Tollar

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The National Center for State Courts is a nonprofit organization dedicated to the modernization of court operations and the improvement of justice at the state and local level throughout the country. It functions as an extension of the state court systems, working for them at their direction and providing for them an effective voice in matters of national importance.

In carrying out its purpose, the National Center acts as a focal point for state judicial reform, serves as a catalyst for setting and implementing standards of fair and expeditious judicial administration, and finds and disseminates answers to the problems of state judicial systems. In sum, the National Center provides the means for reinvesting in all states the profits gained from judicial advances in any state.

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PREFACE

The activities of both a trial judge and his official court reporter in an imaginary Philadelphia Superior Court were depicted in a 1976 network television series, and for the first time on television, a court reporter was given a major role.

Also in 1976, in the real Philadelphia Court of Common Pleas, an innovative program illustrated the implementation of a fully operational computer-aided transcription (CAT) system for the production of transcripts. The program assigned to the court reporters a major role and utilized technology in a supporting capacity.

That program was the result of this study, which was funded by the National Institute of Law Enforcement and Criminal Justice of the Law Enforcement Assistance Administration. This report discusses the implementation and impact of computer-aided transcription in the Philadelphia Court of Common Pleas and several other court facilities in the nation.

The objectives of our study were threefold: to fully describe and analyze the basic process of computer-aided transcription, to document and assess the technical and financial feasibility of introducing computer-aided transcription in the courts, and to assist courts and court reporters to better design, select, implement, manage, and assess computer-aided transcription production systems. Our report also includes the probability of success for future computer-aided transcription installations.

The *User's Guidebook to Computer-Aided Transcription* has been written primarily for court officials, including trial and appellate judges, court administrators, and court reporters. Administrative agencies, legislators, and other organizations for whom transcript expenditures are becoming a heavy burden should also find this report of interest, as will freelance reporters who may desire to use this new technology.

Various National Center staff members, including Edward B. McConnell, Barry Mahoney, Douglas C. Dodge, Donald S. Skupsky, and Mae Kuykendall, spent time reviewing earlier drafts. Harry Foster and Eugene Sattler of the National Shorthand Reporters Association provided additional comments. Lois Bierman and Angela McCorrison provided secretarial assistance, and Elizabeth Anderson, Vilma Boubelik, and Nancy Allbee supplied editorial review for the final publication.

We also appreciate the support and cooperation of many employees in the Philadelphia Court of Common Pleas and express appreciation especially to Larry Polansky, Michael Altier, and Dennis Moran of the Philadelphia Court Administrative Office; to Jane Pace and Ronnie Sablowsky for excellent administrative assistance and data collection in the Philadelphia court; and to the Philadelphia CAT court reporters for their willingness to test this technology. In particular, we appreciate the encouragement of Cheryl Martorana, Carolyn Burstein, Robert Duncan, and Bonnie Gowdy of the Courts Section of the National Institute of Law Enforcement and Criminal Justice.

To the CAT vendors who were willing to disclose and discuss with us their capabilities, and to the several judges, court administrators, and court reporters who have experimented with CAT and answered our extensive questions, we are grateful.

Rarely has the judiciary led American industry and other government agencies in introducing a technological innovation. We hope that this report will help ensure success for those courts and agencies entering the computer age of transcript production.

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J. Michael Greenwood
Jerry R. Tollar

EXECUTIVE SUMMARY

Verbatim transcripts are usually required for appellate review of trial proceedings and for trial review of grand jury proceedings, arraignments, and preliminary or probable cause hearings. However, obtaining timely transcripts is a serious problem for both the trial and the appellate courts in many jurisdictions. At present, many courts encounter increasing transcript delays, growing transcript backlogs, insufficient numbers of qualified court reporters, and increasing transcript costs and fees.

The stenotype method is the predominant technique used to record and transcribe court proceedings. It is a multi-stage, labor-intensive process.

Use of computer-aided transcription (CAT) is a technological approach to improving and expediting the stenotype method of recording and transcribing by reducing the reporter's involvement in the burdensome transcript preparation process.

The National Center for State Courts, under a National Institute of Law Enforcement and Criminal Justice grant, undertook this project to evaluate the commercial feasibility of computer-aided transcription (CAT) for the courts. The major research objectives were to:

—Evaluate the technical feasibility and economic viability of computer-aided transcription (CAT).

—Measure the impact of CAT upon transcript delays.

—Assess the utility of CAT for various groups within the judicial system.

—Review the progress of CAT demonstration projects in various courts.

—Review the development of CAT capabilities and services available and assess the potential for the courts in the next few years.

The CAT process normally consists of six fundamental operations and procedures.[1]

—Recording of courtroom testimony onto a modified stenotype device, which produces paper notes but also records them onto cartridges or cassettes which can be read by computer input devices;

—Development of a court reporter dictionary or profile which adjusts computer translation to each reporter's style;

—Reporter orientation and training to acquaint him or her with the equipment and procedures of a CAT system;

—First-run translation of the electronically recorded stenotype notes into reasonably accurate English prose;

—Text-editing to correct any errors in the format or text of the transcript produced in the previous step; and

—Printing of the final official transcript.

To cover sufficiently these research objectives, three research approaches were instituted by the research team:

—Implementation and comprehensive evaluation of a large scale, court-operated CAT system in the Philadelphia Court of Common Pleas.

—Monitoring of the progress of CAT instituted or demonstrated in other courts.

[1]Chapter 2 contains a detailed explanation of the six elements and elaborates on the production approaches and equipment necessary for a CAT system.

—Evaluation of the commercially available CAT systems for the courts by establishing production standards and assessing CAT vendor capabilities.

The Philadelphia CAT operation was the principal evaluation component in the project.[2] Extensive data collection and evaluation procedures were instituted to assess continuously reporters using CAT or traditional transcription methods both before and during the demonstration project. The following measures of efficiency were tabulated and analyzed:

—Transcription time: the time (number of calendar days) necessary to prepare a record of court proceedings.

—Transcription costs: the total cost per page related to the preparation of the record.[3]

—Effective reporter utilization: the percentage of time reporters were unavailable and amount of reporter time involved in transcription process.

The results from our examination and assessment of computer-aided transcription utilized under court conditions, particularly the Philadelphia CAT operation,[4] are as follows:

—CAT can dramatically increase transcript production and decrease transcript delays when used instead of traditional stenotype transcription methods.

—CAT is economically competitive with traditional transcription methods under appropriate conditions and management controls such as proper selection of CAT service approach, sufficient transcript volume, reporter motivation and skills, comprehensive administrative procedures, and production norms. The CAT project in the Philadelphia Court of Common Pleas was found to be commercially feasible and has been continued after the funding from the demonstration was ended.

—CAT permits better utilization of court reporters for both recording courtroom testimony and preparing official transcripts.

—CAT is technically feasible for court use.

—Of official court reporters, 40 to 60 percent probably have sufficient skills to be compatible with CAT.

—Several commercial CAT services are presently available.

—CAT users can achieve the following minimum production standards as recommended in this report: (a) 95 percent accuracy on first-run translation, and (b) an editing rate of 25 pages per hour on a cathode-ray-tube (CRT) text-editing system.

The implementation of CAT can be a formidable task. As demonstrated in several court projects using CAT, the success of a CAT operation is related to the degree of careful and thorough project management, including preparation, design, selection, installation, and operations of a CAT system. This report suggests remedies[5] to the following problems concerning fundamental steps necessary to plan and manage CAT:

—How to assess properly transcript demand and court reporting workload to determine whether CAT is an appropriate alternative.

—How to determine which CAT equipment and services are most suitable for a particular jurisdiction.

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[2] Other jurisdictions initiating a CAT project were provided a booklet (J. Michael Greenwood and Jerry R. Tollar, *Evaluation Guidebook to Computer-Aided Transcription*, National Center for State Courts Publication No. R0019, December 1975) which contained detailed methodology for assessing CAT and traditional transcription methods. Unfortunately, few projects collected or analyzed data regarding their transcript production.

[3] Chapter 3 provides detailed methodology for accurately determining CAT costs.

[4] Chapter 4 provides a detailed case study of the Philadelphia CAT project.

[5] See Chapter 5.

—How to develop a comprehensive request for proposals (RFP) and evaluate bidder responses for CAT.
—How to properly select court reporters for CAT.
—How to implement and manage a CAT project, including appropriate scheduling, court reporter training, and production controls.
—How to comprehensively evaluate a CAT system.

A number of ancillary questions arose concerning the use of CAT, such as:

—Who should control the CAT process?
—What is the most efficient approach to text-editing with CAT?
—What is meant by court reporter "compatibility" with CAT?
—What transcript lengths are most appropriate for CAT?
—Is a CAT first-run transcript (rough draft) adequate?

Chapter 6 provides answers based on the court experience in operating CAT and includes several predictions concerning the potential of CAT for court reporting:

—CAT will permit thirty-day transcript production for nearly all transcripts in accordance with American Bar Association and National Advisory Commission on Criminal Justice Standards and Goals standards.
—CAT will be implemented principally in medium and large metropolitan jurisdictions during the next few years.
—CAT costs will continue to decrease.
—More standalone CAT systems will be developed (a single minicomputer capable of totally producing CAT, including translation, text-editing, and printing operations.)
—Both courts and vendors will establish regional or statewide service centers to process CAT.

1. INTRODUCTION

Historical Background

In 1971, the National Bureau of Standards completed a research project entitled *A Study of Court Reporting Systems*[1] which tested the feasibility of using computers to aid in transcript production. That report compared computer-assisted methods with several other court reporting methods. The assessment was completed mostly under laboratory-controlled conditions with very limited use under actual conditions (that is, fewer than 100 pages of official court transcripts were produced).

The National Bureau of Standards study found that while computer-aided transcription (CAT) was sound conceptually, serious technical deficiencies prevented the implementation of a full demonstration project for court use. The report specified that several segments of the CAT process required further improvements, including the screening, selection and training of court reporters; the dictionary and translation software; and the text-editing capabilities.

Despite these technical limitations and the possible need for changes in the stenotype reporter's existing practices, the report concluded that CAT had great potential to relieve transcript backlog and improve court reporter utilization. The study stressed that further research and developments should be supported to remedy deficiencies of current computer transcription techniques and to enhance the capability for preparing court transcripts.

In 1973, the National Center for State Courts (under a grant from the National Institute of Law Enforcement and Criminal Justice of the Law Enforcement Assistance Administration) undertook a study to determine the current feasibility of CAT and provide courts with basic background information on the process. Early in the study, the staff determined that CAT was by then technologically feasible, that nearly all problems addressed by the earlier National Bureau of Standards study had been resolved, and that courts could now implement a fully operational CAT program.

A 1975 National Center report[2] provides courts with detailed methodology for examining and comparing CAT to traditional transcription techniques in terms of important production criteria: time, cost, transcript quality, and reporter utilization. Potential court users are also provided basic information describing the available CAT service approaches.

This publication, the *Users Guidebook to Computer-Aided Transcription*, takes the examination of CAT one step further—through an actual fourteen-month demonstration project in the Philadelphia Court of Common Pleas. This report also explores and assesses the development of CAT in the last five years.

Why has CAT taken so long to reach the courts? And what are the court reporting and transcript delay problems evident in most state court systems for which CAT is lauded as a partial solution? It is important that the reader understand these background issues in greater detail before the current research is examined in the remainder of this report.

Transcript Problems

Transcript delay is a serious problem in most state court systems and a principal cause of appellate delay. Various groups have recommended that administrative efforts and proven technical innovations be adopted to ensure that all transcripts are completed and filed either within thirty days of the close of trial or at least within thirty days after the order date for the transcript.[3] Research in several states indicates that most transcripts are actually submitted

[1] National Bureau of Standards, *A Study of Court Reporting Systems* (4 volumes), (Gaithersburg, Md.: National Bureau of Standards, 1971).

[2] J. Michael Greenwood and Jerry R. Tollar, *Evaluation Guidebook to Computer-Aided Transcription* (Denver: National Center for State Courts, 1975).

[3] Various national commissions, conferences, and noted law professors have described transcript delay as a major cause in the delinquency of the final disposition of cases, including the National Commission on Criminal Justice Standards and Goals, the Law Enforcement Assistance Administration; the National Conference on Appellate Justice; the American Bar Association Standards Relating to Criminal Appeals; the American Bar Association's Standards for Appellate Justice; Paul Carrington, Daniel J. Meador, and Maurice Rosenberg, *Justice on Appeal* (St. Paul, Minn.: West Publishing Co., 1976).

after the thirty-day limit (nationally, 80 to 95 percent of transcripts are delinquent) and even after statutory time limits have expired (20 to 75 percent of transcripts). Further research studies have shown that transcript production normally takes from two months to over one year.[4]

Many of the reasons for transcript delay are known. In the past decade there has been an explosion of litigation in the courts. The increase in the crime rate and the corresponding increase in criminal caseload within the courts is well documented. However, accompanying this increase in caseload is a corresponding increase in criminal appeals, especially from indigent criminal defendants (who constitute 90 to 95 percent of all criminal appeals). Civil appeals have also greatly increased.

Court Reporter Problems

Peter Drucker stated "technology is not about tools, it deals with how man works."[5] By 1974, most of the so-called technology-related limitations of CAT had been resolved. However, the people-related problems concerning the court use of CAT had not been sufficiently studied and were not understood.

The purpose of court reporting services is the preparation of an official record of proceedings so that an appellate court can properly review trial and pretrial proceedings, and so that the trial court and lawyers can review preliminary hearings and grand jury proceedings. The predominant court reporting technique used in trial courts of general jurisdiction is stenotype reporting. This method has normally required that transcripts be produced by manual typing. This multi-stage, labor-intensive process normally requires heavy reporter involvement in the transcription process. The overloaded court reporter frequently either must be relieved of courtroom duties or spend evenings and weekends preparing transcripts. This has resulted in inefficient utilization of the court reporter and has sharply increased expenses to the courts and litigants needing transcripts.

Traditionally, stenotype reporters have been allowed to control totally and monitor their reporting and transcription process, to screen and select new reporters, and to establish and lobby for higher salaries and higher transcript fees. The court reporting profession has also become accustomed to the piecework rate, a compensation practice which has been eliminated in most other professions and for most other court employees.

Under present conditions many courts face (1) an increase in transcript delays and a growing transcript backlog of incomplete transcripts, (2) an insufficient number of competent stenotype reporters, and (3) a sharply increasing cost for court reporter services, for both personnel and transcripts.

Some courts are experiencing problems due to a national shortage of qualified court reporters. Stenotype court reporters normally require more than two years of training to learn the basic stenotype skills and meet the minimal proficiency standards. While there are several hundred reporting schools in the country, the National Shorthand Reporters Association has certified only fifty-one programs as meeting the minimum training and educational standards. The attrition rate during the training process sometimes reaches 85 to 95 percent of the students. In addition, several states which require applicants to take a stenotype proficiency examination find few qualified applicants—usually between 5 to 10 percent of applicants fully qualify. This has caused many courts to lower their selection standards.

Court reporters should be expected to record court proceedings where required and to produce an accurate transcript, if required, within the shortest feasible time and at the lowest reasonable cost. Unfortunately, in too many courts, reporters are unavailable to record court proceedings, transcripts are consistently late, transcript quality varies greatly, and transcript costs are continually increasing.

Use of Computer-Aided Transcription

The basic purpose of a CAT system is to aid the reporter in the tedious task of reading, translating, editing, and printing transcripts. The computer can perform these tasks many times faster than a human being. In turn, the court reporter can devote full time to recording the court proceedings, where his skills and abilities are most productive.

Probably the biggest obstacle in the next few years concerning the implementation of CAT is lack of acceptance by official court reporters. Many court reporters fear that CAT will eliminate their jobs,

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[4] See Daniel J. Meador, *Appellate Courts: Staff and Process in the Crisis of Volume*, prepared for the National Center for State Courts (St. Paul, Minn.: West Publishing Co., 1974), and the following National Center for State Courts publications: *Court Reporting Services in Maryland* (1976); *Puerto Rico Court Reporting Study: Phase I and II* (1975–76); and *Nebraska Court Reporting Project: Final Report* (1975).

[5] P. Drucker, *Technology, Management & Society* (New York: Harper & Row, 1973), p. vii.

reduce their status, limit their income, change the nature of the transcription process, and reduce or eliminate their control of the transcription process.[6] Most of these fears reflect the reporters' misunderstanding of the CAT technique and process.

CAT can never function without the stenotype reporter. For most court reporters, CAT will require some retraining or modification in stenotype style. In most cases the CAT system will be modified to match the reporter's style more than the reporter will have to modify his techniques and style to meet the computer's requirements. This technology will also require courts and court reporters to learn more about the capabilities and limitations of the computer process and to better manage court reporting resources.[7] CAT, if properly selected and managed, will help the stenotype reporter:

—increase transcript production;
—hold down transcript costs in the future;
—alleviate the monotonous and often boring task of dictating and manually typing the transcript;
—keep pace with the growing transcript demands;
—greatly reduce the time (including evenings, weekends, vacations) required to produce transcripts; and
—spend time primarily proofreading to ensure high accuracy of the final transcript.

Several years ago, the authors began to use the term "computer-aided transcription" rather than "computerized transcript" for this technological innovation. The new name clearly reveals the precise purpose of this technology; namely, to greatly aid the court reporter in the transcript process by enhancing the court reporter's capabilities rather than by producing transcripts in place of him.

Although computer-aided transcription appeared promising in 1971, manufacturers failed to refine their systems immediately and to adapt them for use by courts and court reporters. There are various explanations for the slow development and exploration of CAT.

Most court operations are more appropriate for dealing with the workload of litigation and appeals of the nineteenth century rather than the twentieth. Most courts and court reporters are unfamiliar with the application of modern technology in the judicial process. Furthermore, court reporters are fearful of any new technology for recording or producing transcripts owing to concerns about job security and apprehensions about the effect upon their work methods and duties. Few companies (most small and undercapitalized) have attempted to develop CAT systems in the past five to ten years. As with the introduction of other technical innovations, many CAT companies are uncertain of the market potential and practical aspects of using computers for transcribing stenotype notes.

Only recently has the judiciary clearly recognized and focused on transcript delay and court reporting problems. The true costs of court reporting services and transcript preparation have been misunderstood or rarely determined by either the court or court reporters, and no demonstration project existed to fully implement, operate, and evaluate CAT and to establish practical CAT standards, norms, and policies.

Project Objectives and Methodology

The National Institute of Law Enforcement and Criminal Justice awarded the National Center for State Courts a grant entitled "Computer-Aided Transcription: Evaluation of the Commercial Feasibility for the Courts." The principal research objectives of the study were to:

1. Evaluate the technical feasibility and economic viability of CAT in the adjudicative process.
2. Measure the impact of CAT upon trial delay, particularly with respect to its potential for reducing transcript delays.
3. Assess the utility of CAT for various groups within the judicial system—the trial and appellate courts, court reporters, and related criminal justice agencies.
4. Review and report on the development of CAT capabilities available from vendors and assess their potential for court services in the next few years.
5. Monitor court demonstration projects of CAT.

So that CAT might be demonstrated and evaluated in a major court system, the grant provided substantial funding to establish and initially subsidize a court-operated CAT service center in the Philadelphia Court of Common Pleas. Under this pilot project the court operated and controlled CAT service for an initial fifteen reporters on the CAT system. This permitted a one-year, detailed analysis of the cost, time, and quality of transcript production and an assessment of all CAT production proce-

[6] For an illustration see James C. Hyatt, "Trying Days in Court: Shorthand Reporters Fear Use of Computers to Speed their Work Will Cut Status, Income," *Wall Street Journal*, September 29, 1976.

[7] See J. Michael Greenwood and Douglas Dodge, *Management of Court Reporting Services* (Denver: National Center for State Courts, 1976).

dures. The Philadelphia CAT experiment has been the largest and longest demonstration of CAT in a state court system. Several other court organizations initiated or experimented with CAT services during 1975–1976. The National Center monitored the progress of the other projects and, in most instances, made on-site visits to discuss the accomplishments and limitations of CAT.

To remain abreast of manufacturer developments, the National Center visited corporate facilities, reviewed and assessed literature on the topic, reviewed and assessed the technical capabilities of each manufacturer's system, and met with marketing and technical personnel in these organizations concerning new equipment, marketing approaches, and CAT installations.

Presently four vendors are involved in CAT: Barons Data Systems of Oakland, California; Stenocomp, Inc. of Falls Church, Virginia; Stentran, Inc. of Vienna, Virginia; and Stenograph Machines, Inc. of Skokie, Illinois. Appendix A contains our review and assessment of these vendors in three areas: (1) basic CAT services being offered or anticipated, i.e., hardware configurations and capabilities, training services, CAT services offered, and pricing; (2) performance record to date, i.e., transcript production capabilities, prices, training capability, stability of operation, and user evaluation; and (3) performance standards, i.e., first-run translation accuracy, editing speed, and other production capacities and capabilities.

Since computer-aided transcription is a new court reporting technology, the terminology and concepts used to describe its procedures and systems have not been precisely defined. Various companies and organizations often use conflicting terms to describe the same activity or procedure. To diminish ambiguity, we have included a glossary of the most frequently used terms.

Glossary

Acoustic coupler or modem: a device to permit data transmission across telephone lines.

Burster and decollator: two devices which, in combination, will transform a stack of multi-part, continuous form paper into sets of collated pages.

Cathode ray tube (CRT) terminal: a combination keyboard and viewing screen which permits rapid interaction with a computer or minicomputer.

Classical CAT system: the classical equipment configuration for a CAT system—e.g., composed of a large-scale translation computer and a text-editing subsystem.

CRT text-editing: editing in which an individual uses a CRT terminal to electronically change the text or format of transcripts.

First-run transcript: the first-run translation in printed form.

First-run translation: the initial computer translation of electronically recorded stenotype notes into English prose, without any human editing or correction of its errors.

Homograph: a stenoform, or short series of stenoforms, which may simultaneously represent one or more different words or phrases.

Homophone: a word which sounds like another but is spelled differently—e.g., "there" and "their."

Hybrid system: a system in which the overall control is divided between the vendor (who controls translation) and the user (who controls text-editing and final transcript production).

Job sheet: a sheet of information which a reporter submits along with his cassettes to the CAT service center.

Lexicographic support: consultation which helps a reporter to modify his style so that his first-run translation will be more accurate.

Modified stenotype device: a stenotype device which produces paper notes but also records them upon a cartridge or cassette which can be read by computer input devices.

Project life: the duration of a project.

Proofread-editing: editing in which an individual proofreads the first-run transcript and makes notations to indicate appropriate modifications and additions to the transcript text or format.

Proration period: a time period over which equipment or service should be amortized.

Reporter dictionary: an aggregate of stenoforms and transliterations which the computer software uses to translate the notes of an individual reporter.

Reporter profile: a unique matrix table (identifying a reporter's note-taking style) which the translation software uses to translate the notes of an individual reporter.

Software program: computer instructions which make a computer operate.

Standalone CAT system: a minicomputer system which, all alone, performs both translation and text-editing activities.

Start-up costs: usually large, one-time costs which are incurred prior to CAT operations and often should be amortized.

Stenoform notes: keystrokes which a stenotypist

records to represent a verbatim record of proceedings.

System life/technical life: the useful life of a system or technology.

Text-editing operator: the individual who performs CRT text-editing.

User-controlled CAT system: a CAT system in which the user controls first-run translation, text-editing, and final transcript production.

Vendor-controlled CAT system: a system in which the CAT vendor or a licensed third party controls first-run translation, text-editing, and final transcript production.

2. CAT SERVICES AND SYSTEMS

Several vendors currently offer an assortment of CAT services and equipment. Potential CAT users must choose from these services, production approaches, and equipment configurations. This chapter provides a background for understanding the basics of a CAT system.

Service Elements

For viable CAT production, a user must assemble six basic service elements: (1) a modified stenotype device; (2) a reporter dictionary or profile and vendor lexicographic support; (3) a reporter orientation program; (4) a first-run translation system; (5) a text-editing system, and (6) final transcript production. The first three elements are necessary to successfully prepare a reporter for a CAT system; the last three elements are the basic operations of a complete CAT system.

Modified Stenotype Devices

No computer input devices currently can read the paper stenoform notes produced by a stenotype reporter.[1] Instead, CAT vendors provide a modified stenotype device equipped with an electronic recorder. The stenotype device still produces paper notes, but also records the reporter's keystrokes on cartridges or cassettes which can be read by computer input devices. The reporter's work tasks and techniques are basically unchanged; in fact, most observers can see no difference in the reporter's equipment or activities.

Although a temporary replacement unit will serve a reporter when his own unit is not working, every CAT reporter should have his own modified stenotype device adjusted for his touch.

Earlier modified stenotype devices were awkward to handle and needed to be plugged into an electrical outlet. Newer models are readily portable and often operate from a self-contained, rechargeable battery pack as well as from standard AC outlets.

Currently, each CAT vendor manufactures a proprietary device adapted to his system. Fortunately, all vendors will soon use standard cassettes as their recording medium. Hopefully, CAT vendors will also standardize stenotype devices, thus reducing possible equipment obsolescence and additional costs if users switch to another CAT vendor.

Reporter Dictionary Compilation and Lexicographic Support

No two stenotype reporters are likely to record the same stenoforms of a lengthy proceeding, since there are many different schools or systems of stenotyping. Depending upon his training and needs, a reporter may use a combination of these stenotyping systems. Furthermore, a reporter may develop his own styles and shortcuts, often resorting to special abbreviations for repetitive phrases or unusual words.

Because of cost and size considerations, it is impractical to create a universal dictionary of all stenoforms used by reporters. Translation conflicts would also occur since different reporters may use the same stenoform for different words. A number of partial solutions have been implemented in an attempt to resolve the problems: (1) selecting reporters whose reporting systems and styles are most compatible with the CAT system, (2) compiling individualized dictionaries or style profiles for each reporter, and (3) providing lexicographic support to help reporters recognize style changes which will improve their first-run transcript accuracy.

Selection of Computer-Compatible Reporters. Not all stenotype reporting styles are compatible with CAT. To be compatible with CAT, a reporter's style must be consistent (each stenoform representing an English word without ambiguity) and notes must be clean (without keying errors). Vendors and users alike should assess each reporter's style to determine his likelihood of achieving sufficient first-run translation accuracy (95 percent). Accordingly, most vendors analyze each reporter's style from sample notes, profile questionnaires about writing styles, or standardized dictation tests.

[1] See Chapter 6 for a discussion of optical scan equipment to read paper notes.

Reporter Dictionary or Profile Compilation. After a reporter is selected, the vendor compiles an individualized dictionary or profile for him. This dictionary or profile takes into account the normal variations in note-taking styles and supplements any existent universal dictionary. Compiling the dictionary or profile is an extensive task which can only be performed by the vendor. With time, fewer additional entries are needed and the reporter may update the dictionary himself.

Lexicographic Support. Even after a CAT reporter has an individualized dictionary or profile, his style may not be perfectly compatible with CAT. Such a dictionary or profile reduces errors, but it cannot resolve problems of inconsistent or ambiguous notes. These problems result in first-run translation inaccuracies and require additional editing time. The vendor's lexicographic support addresses these problems and helps clean up the reporter's style. The need for this support decreases when a reporter's style has improved and he learns to diagnose his own problems.

Reporter Orientation

A CAT reporter must be trained to operate the modified stenotype device and to interact with a CAT service center.

The Modified Stenotype Device. The CAT vendor should instruct reporters on the operational use, maintenance, and occasional problems of the modified stenotype device.

Keystroke "Codes." While recording proceedings with a modified stenotype device, a CAT reporter utilizes codes to give special signals to the translation program. For example, a special code is used to begin a new text format or to indicate mistakes. The CAT vendor instructs the reporters on the use of these keystroke codes.

Orientation to Dictionary Compilation and Lexicographic Support. As discussed earlier, the vendor provides each reporter with an individualized dictionary (or profile) and lexicographic support. The vendor should provide orientation about the purpose and procedures required for both.

Interaction with the CAT Service Center. The vendor or CAT service center should inform reporters of available services and procedures for working with the service center. Usually three procedures must be outlined: (1) how to complete a "job sheet" and submit a job for translation, (2) how to edit the first-run translation with the proper notations, and (3) how to order final transcripts.

First-Run Translation

The computer translates the stenotype notes of the reporter into prose which is about 95 percent accurate. Since the remaining 5 percent must be corrected in a subsequent stage, this first step is called "first-run translation."

Software programs for first-run translation are proprietary; that is, owned and controlled by the CAT vendors. It is not feasible for a court to develop a translation software package, since several years of development would be required.

When a CAT reporter submits cassettes containing his notes for first-run translation, he must also complete a "job sheet." A job sheet serves several purposes: it identifies the reporter, specifies his dictionary or profile, provides handling instructions, and identifies unique stenoforms for the particular job (e.g., proper names, titles, abbreviations, special terminology).

The job sheet information is entered into the computer along with the stenotype notes (on cassettes). The translation computer translates these notes into prose by using the job sheet information, the reporter's dictionary or profile, and the universal dictionary, if any. This first-run transcript is stored in the computer system. It can then be printed for proofread-editing by the reporter or displayed on a cathode ray tube (CRT) terminal for viewing or CRT text-editing.

Text-Editing

First-run translation seldom produces error-free transcripts. Usually, the reporter also needs to make modifications in format, punctuation, and the like. Since pen and ink corrections are normally unacceptable on a final transcript, text-editing procedures are necessary for the final correction of transcripts.

After first-run translation, a CAT service center usually prints the first-run transcript and delivers it (or mails it) to the reporter. The reporter proofreads and edits his first-run transcript, using standard notations for his corrections, and returns the corrected transcript to the CAT service center. At the service center, a trained text-editing operator uses a specialized CRT-based text-editing subsystem to make corrections according to the reporter's notations. The final transcript is then stored until the CAT service center prints it.

Final Transcript Production

Before printing, the reporter determines how many transcripts are required. CAT service center prices

Figure 2.1
Types of CAT Services and their Advantages and Disadvantages

Vendor-Controlled		
Advantages The user does not have to acquire computer equipment or time-sharing services, and does not have to provide personnel or service center facilities. The vendor is responsible for production efficiency; system support is usually good, and project start-up can be rapid.	*Disadvantages* The vendor dictates the production approach; the user has little control over production. The vendor selects the site of the service center facilities; there may be a need to mail or deliver materials to the service center.	*Comments* When locally available, vendor-controlled services are favored for small reporter groups. However, CAT programs using distant service centers (e.g., CAT service by mail) are likely to encounter problems.
User-Controlled		
Advantages To a degree, the user can determine his production norms, standards, and approach. The user controls production; his approaches to text-editing and production can be somewhat flexible. The user can sometimes utilize available facilities and equipment. The user selects the site of the CAT service center.	*Disadvantages* The user must acquire computer equipment or time-sharing services and must provide personnel and service center facilities. The user is responsible for production efficiency; some inefficiency is likely. System support can be poor, project start-up can be slow, and the selection of reporters can be marginal.	*Comments* Unless production controls are imposed, user-controlled CAT services usually will operate inefficiently. They require moderate to large annual transcript volumes.
Hybrid		
Advantages The user controls text-editing and final transcript production; his approach can be flexible. The user does not have to acquire computer equipment or time-sharing services for translation (but does for text-editing). The user can sometimes utilize available facilities and equipment. The user selects the site of the text-editing and final transcript production facilities.	*Disadvantages* The potential for inefficient production is high; coordination of vendor and user is often difficult. The user must acquire or design the text-editing and production system if no vendor-designed subsystems are acquired. System support may be poor. The user must provide personnel and facilities for text-editing and production. Project start-up is usually slow, materials will possibly be mailed to the vendor's translation center, and the selection and training of reporters can be marginal.	*Comments* Hybrid systems without vendor-provided text-editing subsystems are not recommended. With vendor-provided subsystems, CAT is much more likely to succeed.

are usually based upon the number of pages and copies ordered. The reporter and service center must also prepare a title page and an index page and provide a reporter certification page for the final transcript. Some CAT service centers may also retain the final transcript on magnetic tape, in case additional copies are needed later.

Production Approaches

Several different production approaches have been taken by CAT vendors. Potential user groups should recognize the basic differences between these CAT services and should evaluate each according to their needs. (Appendix A provides a description of each vendor.)

Classifications of CAT Services

CAT services can be classified as vendor-controlled CAT services, user-controlled CAT services, and hybrid systems. (See Figure 2.1.)

Vendor-Controlled CAT Services. In vendor-controlled CAT services, the vendor or a licensed third party controls first-run translation, CRT text-editing, and final production. Because a large number of reporters is needed to cost-justify (or support) a vendor-controlled CAT system, such service centers are usually located in metropolitan areas.[2] Vendor-controlled services have the following advantages: (1) low start-up costs are charged to users, and a

[2] Service by mail is often offered too, although only on a temporary basis.

moderate initial investment is required for a project, since the only equipment required by the reporter is the modified stenotype device; (2) enhanced production efficiencies (perhaps greater accuracy) can result from stringently enforced vendor procedures; (3) traditional transcription philosophy is continued—i.e., the reporter independently deals with the vendor; and (4) better vendor support is available to *local* reporters, and more convenient and continuous support is feasible.

On the other hand, vendor-controlled CAT services have drawbacks: (1) there is little user control over the CAT approach; (2) the vendor can dictate transcript costs; (3) the vendor may offer CAT services only to highly compatible CAT reporters; (4) logistics problems may exist for users outside of the metropolitan area.

User-Controlled CAT Services. In user-controlled CAT services, the user—normally the court or a group of reporters—controls first-run translation, text-editing, and final transcript production. The user group acquires a license (including equipment and software) from the vendor and pays a usage fee.

Two major advantages exist in user-controlled CAT services: (1) the user exercises a fair degree of control over the production approach, thus allowing some flexibility in text-editing and final transcript production; and (2) the user can select his own site for the service center(s) and can often utilize existing equipment, personnel, and facilities.

Drawbacks also exist: (1) The initial costs of equipment and installation are often large. In addition to equipment, installation, and start-up costs, users must pay for facilities, personnel, and training. (2) The responsibility for efficient production lies squarely upon the user. (3) Start-up may be slow. (4) Vendors may not provide adequate support for reporters or adequate equipment maintenance. Users must ensure such services through a strong contractual agreement.

All factors considered, user-controlled CAT services usually will operate efficiently and inexpensively only if adequate production controls are imposed and sufficient transcript volumes are produced.

Hybrid Systems. Unlike the other systems, the overall control of a hybrid CAT system is divided between the vendor and the user. The CAT vendor, or a licensed third party, controls first-run translation; the user controls text-editing and final transcript production. Two classes of hybrid CAT systems exist: (1) those which use a text-editing subsystem which has been designed and installed by the vendor as part of the total CAT system, and (2) those which use provisional text-editing equipment such as a commercial text-editor or an existing computer with jerry-built software.[3]

Performance has been inefficient and expensive for users who have tried the second alternative. Subsystems which have not been specifically designed for CAT are not suitable. We do not recommend provisional text-editing equipment.

Selection Criteria for CAT Production

Approaches. The following factors should be considered when selecting a CAT approach or services: (1) production efficiency, which includes equipment capabilities—such as throughput time and volume capacity, production regimen, personnel capabilities and project coordination, technical support, and the number of reporters on the system; (2) production control, which weighs user versus vendor control, the flexibility of approach, service center convenience, project start-up time, personnel, and administrative capabilities; (3) transcript quality, which includes reporter selection, reporter capabilities, vendor services such as orientation, dictionary compilation, and lexicographic support, translation capability, text-editing and final production capabilities, personnel capabilities, and supervision; and (4) costs, particularly availability of service center facilities and personnel, operating and administrative costs, vendor fees, and availability of funds.

Equipment Configurations

Two different types of equipment configurations are used in different CAT systems: the classical configuration, comprised of a minicomputer subsystem and a large-scale translation computer, and the standalone system, which is perhaps the wave of the future.[4]

Classical CAT system

The classical CAT system is really comprised of two systems, the translation computer and text-editing subsystems.

Translation Computer. Generally labeled the "host" or translation computer, this large-scale computer performs the first-run translation. The translation computer has a large central memory ("core"), extensive auxiliary storage (disk), and extensive translation software provided by the CAT vendor.

[3] See Appendix B, Tucson and Baton Rouge experiences.

[4] See Chapter 6 for an additional discussion of future projections.

The central memory and extensive auxiliary storage are needed for the large, complicated sorting routines (software), large input files (stenotype notes), and large dictionaries (and subdictionaries).

Text-Editing Subsystems. Normally a minicomputer, the text-editing subsystem, performs text-editing and printing. It also may be used to enter and format data (of stenotype notes and job sheets), to manage files (of dictionaries or profiles and translated or untranslated transcripts), and to transfer jobs to and from the translation computer. Jobs may be transferred via hardwired data channels, through telecommunication links such as telephones with acoustic couplers or modems, or by transferring computer tapes or disks from one system to the other. A text-editing system usually has the following components:

—cassette (or cartridge) reader, to input electronically recorded stenotype notes;
—minicomputer, to serve as a controller of all functions;
—cathode ray tube (CRT) terminals, mainly for text-editing;
—local disk storage space; and
—line printer.

Standalone CAT System

In standalone CAT systems, all CAT activities are performed by one minicomputer—translation and text-editing functions are combined in one system. This is now possible because of three technological improvements in minicomputers (these are improving continuously): better central memory, improved auxiliary storage (disk) capabilities, and improved minicomputer software.

Standalone CAT systems are not yet better than classical CAT systems. They have slower translation speeds and limited multi-programming capabilities (i.e., they cannot handle two sizable activities such as translation and text-editing at the same time). As technological developments continue, however, vendors of classical CAT systems may someday switch to standalone systems.

3. FINANCIAL FEASIBILITY OF CAT

Three steps are necessary for an objective assessment of computer-aided transcription costs:

1. Users should understand the common cost elements of CAT systems.
2. Users should formulate a method to help predict and describe costs for any CAT system.
3. Users should break costs into reasonable per-page costs to compare CAT and traditional transcription costs.

Common Cost Elements

Calculating CAT system costs is complicated. Each vendor has his own service price structure, each CAT program has a unique administrative and operating structure, and each systems approach has different cost elements to tabulate.

CAT costs can be separated into start-up costs and operating costs. Start-up costs are usually large, one-time costs which are incurred prior to actual CAT operations and often should be amortized (see Figure 3.1). Operating costs are recurring costs for operating the CAT system, such as salaries, equipment rental, and consumable supplies (see Figure 3.2).

Unlike operating costs, start-up costs are not directly attributable to daily operations. Start-up costs should be amortized or proportioned over reasonable time periods. When a start-up cost is for a particular piece of equipment, its proration period corresponds to its technical or useful life. For example, the technical life of a modified stenotype device is only two or three years, and the useful life of a computer system is about five years. Equipment also has a re-sale value when a project is stopped before the equipment's technical or economic life has ceased.

A second way to prorate costs is according to program or project life. This proration is used for costs for both equipment and other items, such as personnel training, which provide benefits throughout the life of a project.

Cost Formulation Methods

Cost models can help predict and describe the CAT project-life costs. These costs are incurred in stages which parallel the general sequence of CAT implementation.

General Descriptions

The costs at each implementation stage are described in Figure 3.3. Most stages have been addressed previously. However, three stages are elaborated here because they involve potentially complex

Figure 3.1
Start-Up Costs

Cost Element	*Description*
Equipment	
Stenotype device purchase"	One-time cost. Proration period: about 3 years.
Text-editing subsystem purchase"	Large one-time costs. Proration period: system life (about 5 years) or project life.
Installation	Nonrecurring charge. Proration period: project life.
Facility Equipment (e.g., cabinets, desks)	As required. Proration period: 7-10 years.
Personnel	
Reporter selection	Small reporter charge, often included in other costs. Proration period: project life.
Reporter orientation and dictionary	Usually a reporter charge. Proration period: project life.
Subsystem staff training	Usually a one-time cost, because subsequent staff can have on-job training. Proration period: project life.

"Rental or leasing is occasionally available.

Figure 3.2
Operating Costs

Cost Element	*Description*
Equipment	
Stenotype device rental*	Fixed monthly charge.
Stenotype device maintenance	Fixed monthly fee, or parts and labor.
Translation computer costs	Usually a per-page fee or included in royalties or rental.
Vendor translation royalties	Either a negotiated fixed per-page fee or included in rental.
Text-editing subsystem rental	Fixed monthly fee, perhaps with an excess usage surcharge.
Subsystem maintenance	Fixed monthly charge (often included in rental) or charges for parts and labor.
Personnel	
Supervisor	Depends upon program design and approach.
CRT text-editors	Depends upon program design and approach.
Court reporter	Depends upon reporters. Often overlooked in cost analysis.
Consumables	
Steno cassettes	Fixed unit price, but quantity depends upon needs.
Computer supplies	As needed, but can be included in services.
Paper supplies	As needed, but can be included in services.
Miscellaneous	
Overhead	Depends upon program design. Often overlooked in cost analysis.
Space and utilities	Depends upon program design. Often overlooked in cost analysis.

*Purchase is more common.

Figure 3.3
General Implementation Stages

Stage	*Nature*
1. Reporter selection	Most CAT projects should have a method to select reporters. Potential users must determine whether there are enough computer-compatible reporters for the project.
2. Stenotype devices	Every CAT project must acquire stenotype devices. Different acquisition plans are available.
3. Reporter orientation, etc.	Every CAT project must orient its reporters, compile dictionaries, etc.
4. System installation	These start-up costs are only required for in-house systems or subsystems.
5. Staff training	This is normally only for in-house systems. In addition to personnel costs, provisions should be made for travel and consultant fees.
6. First-run translation	These costs may be simple or complex, depending upon the type of system. For example, a local service center may charge a fixed per-page rate which also includes text-editing and final production. On the other hand, an in-house center has complex costing—royalties, equipment costs, personnel, supplies, and overhead.
7. Text-editing	Like first-run translation, text-editing costs may be simple or complex, depending upon the type of CAT system.
8. Final transcript production	These costs are frequently included in text-editing They too may be simple or complex to calculate.
9. Administration	These costs depend upon the level of project management.
10. Miscellaneous	Numerous costs can be placed here—facilities, power, mailing costs, travel, various supplies.

costing: first-run translation, text-editing, and final transcript printing.

First-Run Translation. Translation costs may be simple or complex, depending upon the type of CAT system. For example, local service centers which are operated by vendors or third-party licensees commonly charge a fixed per-page fee which includes text-editing and basic transcript printing. In-house service center pricing involves four cost categories: (1) royalties—usually in the form of a monthly license fee or a per-page royalty to the vendor; (2) equipment—generally a host computer center will charge a time-sharing fee corresponding to the amount of work performed (for subsystems or stan-

Figure 3.4
Cost Checklist[a]

Project Name: _____ No. of Pages: _____
Project Duration: _____

Cost Element	Start-Up Costs		Operating Costs		Explanation[b]
	Cost	Per-Page Cost	Cost	Per-Page Cost	
1. Reporter selection					
2. Stenotype devices					
Purchase					
Rental					
Maintenance					
3. Reporter orientation, etc.					
4. System installation					
5. Staff training					
6. First-run translation					
Royalties					
Equipment charges					
Personnel					
Supplies					
Mailing					
7. Text-editing					
Equipment charges					
Personnel					
Supplies					
Mailing					
Reporter time					
8. Transcript production					
Personnel					
Supplies					
Mailing					
9. Administration					
10. Miscellaneous					
Overhead					
Space and utilities					
Other					
TOTALS					

[a] The numbered items correspond to normal implementation stages.
[b] E.g., operating costs = monthly costs × number of months.

dalone systems, the translation cost is for the portion of time used in translation); (3) personnel—personnel costs are proportionate to the time spent for translation work; and (4) supplies—transcript paper, ink, magnetic tape, stenotype cassettes.

Text-Editing. Text-editing costs[1] may be complex, depending upon the type of system. Local service centers usually include text-editing charges as part of the translation fee, whereas the pricing of an in-house text-editing center is complex and parallels in-house translation pricing considerations.

Final Transcript Printing. The production of transcripts is usually included in the fixed per-page fee. Some users may wish to separate printing from other production activities such as preparing indexes, creating title pages, and bindings. The amount of time expended on the latter production activities is not proportionate with transcript size.

Cost Sheets

Figure 3.4, a cost checklist, and Figure 3.5, a project life cost sheet, are included for use by potential or actual CAT users. Figure 3.4 may be more useful since it lists the cost elements to consider, it facilitates calculating project life costs, and it presents a breakout of per-page cost, allowing users to analyze each cost component as it affects the per-page cost.[2] Figure 3.5 permits a visualization of costs during a project's life.

[1] Some users will desire to include reporter costs for his corrections to the first run.

[2] Figure 3.4 is used in Chapter 4 to present the cost conclusions for the Philadelphia CAT project.

Figure 3.5
Project Life Costs[a]

Cost Element	Year 1 . . .[b] Qtr. 1	Qtr. 2	Qtr. 3	Qtr. 4	Element Total
1. Reporter selection					
2. Stenotype devices					
3. Reporter orientation, etc.					
4. System installation					
5. Staff training					
6. First-run translation					
Royalties					
Equipment					
Personnel					
Supplies					
Mailing					
7. Text-editing					
Equipment					
Personnel					
Supplies					
Mailing					
Reporter time					
8. Final transcript production					
Personnel					
Supplies					
Mailing					
9. Administrative					
10. Miscellaneous					
TOTALS					

[a]The numbered items correspond to normal implementation stages.
[b]Repeat chart segments as needed for chart life.

Per-Page Costs

In comparing CAT with traditional transcription techniques, users must be sure to consider start-up costs, overhead costs, and other hidden costs—items which are seldom included in determining per-page costs for traditional transcription.[3] Hidden, indirect, and start-up costs should be considered equitably; costs included for one technique should not be excluded from the other. Similar cost components should appear in both cost estimates (see Figure 3.6).

Overhead and hidden costs for traditional transcription techniques might include reporter office space and utilities, equipment (desk, chairs, bookshelves, typewriters, dictation units, and backup recorders), supplies (paper, ink, ribbons, office supplies, transcript binders, dictation tapes, stenotype pads, and recording tapes), copying services, and unavailability costs (court reporter unavailable for courtroom duties owing to transcript production backlog, thus requiring a backup reporter). Failure to include all such costs leads to a substantial understatement of true costs.[4]

In this report, we provide cost methods and figures which give users an accurate assessment of CAT's operating costs as well as start-up and other frequent hidden costs. In fairness, however, unless full start-up and hidden costs are also calculated for traditional transcription techniques, a fair proportion

[3] Comparative costing techniques are discussed in J. Michael Greenwood and Jerry R. Tollar, *Evaluation Guidebook to Computer-Aided Transcription* (Denver: National Center for State Courts, 1975), pp. 16–18 and 31–34.

Figure 3.6
Cost Elements: CAT vs. Traditional Stenotype Methods[a]

CAT	Traditional Methods
1. Reporter selection[b]	1. NA[c]
2. Modified stenotype devices	2. Stenotype machine
3. Reporter orientation, etc.[b]	3. NA
4. System installation	4. NA
5. Staff training	5. NA
6. First-run translation	6. Transcription
Royalties	NA
Computer costs	Dictation unit, transcribing unit, typewriter
Translation personnel	Dictation time, notereader, typing time
Cassettes, computer supplies, paper	Dictation tapes, typewriter ribbon, paper
Mailing, if needed	NA
7. Text-editing	7. Proofreading
Subsystem costs	NA
Text-editing personnel	NA
Minicomputer supplies	NA
Mailing, if needed	NA
Reporter proofread-editing	Reporter proofreading
8. Transcript production	8. Typing
Decollating and binding	Retyping (if needed), copying, and binding
Multi-part paper, binders	Paper, carbon paper, binders
Mailing, if needed	NA
9. Administration	9. Administration
10. Miscellaneous	10. Miscellaneous
Overhead	Overhead
Space and utilities	Office space, desks, chairs, and utilities

[a]The numbered items correspond to normal implementation stages.
[b]These are incremental costs of converting stenotype reporters into CAT reporters.
[c]Not applicable.

[4] An interesting short article is Bobby C. Rogers, "Want to Earn $100 Per Hour?" *National Shorthand Reporter* (November 1976), which points out that the often quoted price of 40¢ to 60¢ per page for transcripts produced by the dictation method underestimates production costs by at least 20¢ per page.

of CAT's start-up, hidden, and investment costs should be written off as costs of development. Examples of such costs are reporter selection, modified stenotype devices, reporter orientation, dictionary compilation, staff training, text-editing subsystem purchase, overhead, space, and utilities.

4. ASSESSMENT OF CAT PROJECTS

Case Study of Philadelphia Computer-Aided Transcription System

Court Background

The Philadelphia Court of Common Pleas is a court of general jurisdiction, responsible for handling felony, family, orphans, and civil litigation for the two million people of Philadelphia.

The court is composed of ninety-one judges. Fifty-five are normally assigned to criminal proceedings, twenty-six to family, orphans, and probate court, and ten senior judges handle civil matters. Of the ninety official court reporters employed by the court, fifty-three are normally assigned to criminal trial judges, twenty-six to civil, family and other minor matters, and eleven to a pool from which they are usually assigned to criminal matters.

In 1975, the Philadelphia Court of Common Pleas disposed of nearly 10,000 criminal cases (including 570 homicides) and 4,500 civil cases. Criminal caseload consisted of 450 criminal jury trials, 3,100 nonjury trials (waiver trials), and 7,600 pretrial and trial motion hearings. Civil litigation included 300 jury trials, 175 nonjury trials and over 3,600 pretrial motion hearings.[1]

Each year over 1,000 criminal appeals are filed, 90 percent of which involve indigent defendants. Over 650,000 original pages of transcript are produced annually for these criminal appeals.

New rules for appellate procedure were adopted in 1976 for the Pennsylvania courts. Rule 1922 requires that official transcripts be filed by the court reporter within fourteen days after receipt of the notice of appeal. Court policy and rules previously required transcripts to be filed within thirty days of the notice of appeal.

The total expenditures for court reporting services and transcript fees incurred by the Philadelphia Court of Common Pleas exceed $4 million annually. This figure includes $2.5 million for court reporters' base salaries and fringe benefits ($22,700 each plus 23 percent fringe benefits), $1 million for criminal transcripts ($1.60 per page for the original transcript plus five carbon copies) and $.5 million for overhead and miscellaneous reporting expenses (e.g., supplies, space, telephones, and typewriters).

Many court reporters, particularly those reporting criminal matters, produce over 5,000 pages of transcripts annually. This transcript demand results in extensive transcript backlogs and delays, sometimes exceeding two months. The court administration office employs a supervisor to control and monitor court reporter assignments, but, as in most other jurisdictions, no procedures exist to monitor transcript production and reduce transcript delays.

Project Background

The Philadelphia Court of Common Pleas has encountered problems in providing adequate court reporting services. As the annual caseload statistics indicate, the court experienced a heavy criminal caseload and a large number of criminal appeals. The court administrative office was acutely aware of the heavy transcript demands and backlog, particularly in criminal cases. In an effort to relieve these problems, the court looked to CAT as an alternative to the traditional transcription methods.

Simultaneously, the National Center was seeking a suitable court in which to test a large-scale, court-controlled CAT system, and the Philadelphia court was selected as ideal for several reasons.

First, the court had sufficient transcript demands, transcript backlog, and a large number of volunteers (forty court reporters initially volunteered) to support this demonstration. Furthermore, the court had available two IBM 370/145 computers which could easily handle and operate any CAT vendor's first-run translation software package. An additional consideration was that, at the time, all CAT vendors were within a relatively short distance (either in the Washington, D.C. or the Chicago metropolitan area) and were able to provide continuous support. Finally, the court was willing to contribute over $75,000 worth of additional court administrative

[1] The statistics listed in this section were provided by the Philadelphia Court Administrative Office.

personnel and supplemental funds and services to the project.

The principal objectives of the Philadelphia pilot CAT program were to determine the following:

1. Is CAT a commercially feasible approach for the court (feasibility was defined both in terms of technical and financial feasibility)?
2. What procedural reforms and prescribed policies might be needed to implement and operate a CAT service?
3. What were the production rates and transcript capabilities for a user-controlled CAT approach?
4. What improvements, if any, in transcript performance (transcript production time, transcript cost, and quality of final transcript) could be attained by using CAT compared to traditional transcription methods?

Several aspects of the Philadelphia CAT project were unique. It was the first attempt to implement a user-controlled CAT system. (The system schematic is presented in Figure 4.1.) It required a vendor to install its proprietary software package on a court-controlled IBM 370/145 DOS system. At that time, it was the largest single test, both in transcript pages and number of reporters, of a CAT system in one jurisdiction. A totally dedicated text-editing and printing system for CAT production was desired. A tape drive was installed as part of the text-editing subsystem to transfer data between the text-editing subsystem and the court's large-scale computer system.[2]

Requests for proposals were issued in November 1974 and bids were submitted in December 1974. Stenocomp, Inc. was awarded the contract in April 1975. Because of delivery schedules, vendor organizational problems, and a protest from another CAT competitor, the CAT system was not installed in the Philadelphia Court of Common Pleas until October.[3]

The National Center's project funds, totaling approximately $90,000, helped defray the system start-up costs (purchase of stenotype devices, reporter training, installation, debugging of computer systems). One stipulation of the National Center's NILECJ grant was that the test court achieve self-sufficiency by the completion of the project. Thus a declining subsidy plan was instituted under which, in this user-controlled CAT system, the court paid an increasing percentage of the first-run translation costs over the project duration.[4] Each court reporter was given 500 free pages of CAT production to compensate for the time lost in training and thereafter was charged $.50 per page during the demonstration project. By December 15, 1976, when the demonstration project was completed, the court was self-sufficient as required by the NILECJ grant.[5]

In August 1975 reporter selection was undertaken. The Stenopad® notes of forty volunteer reporters (identified to Stenocomp only by randomly assigned identification numbers) were submitted to Stenocomp for a rating of their compatibility with the Stenocomp CAT system. A ten-point scale was used: 8–10 (good), 5–7 (borderline), and 1–4 (poor). Fifteen reporters were selected for the project.[6]

In September 1975, fifteen modified stenotype devices were purchased for the Philadelphia project. Unlike newer machines, these devices used cartridges instead of cassettes and operated only on AC voltage, rather than both AC or battery-supplied DC voltage.[7]

Finally, in October 1975, the text-editing subsystem was installed in a room adjoining the court's computer center. Stenocomp's translation software was installed on the court's computer at the same time. The CAT service center became operational on October 15, 1975.

Normal Procedures

Job Submission. Court reporters normally submitted their tapes and an appropriate job sheet to the computer center during regular working hours (8:30 a.m. to 5:00 p.m. daily) or placed them in a drop-off basket after court hours. The Philadelphia CAT service center staff prepared and preprocessed all new transcript requests. This activity included inserting the cartridges into the subsystem's cartridge reader, entering the job sheet information at a CRT terminal, placing the notes and job sheet information

[2] Telecommunication systems could have been established; however, since the minicomputer system was located within fifty feet of the court's IBM computer, a tape drive was used.

[3] The full computer system became operational on October 15, 1975.

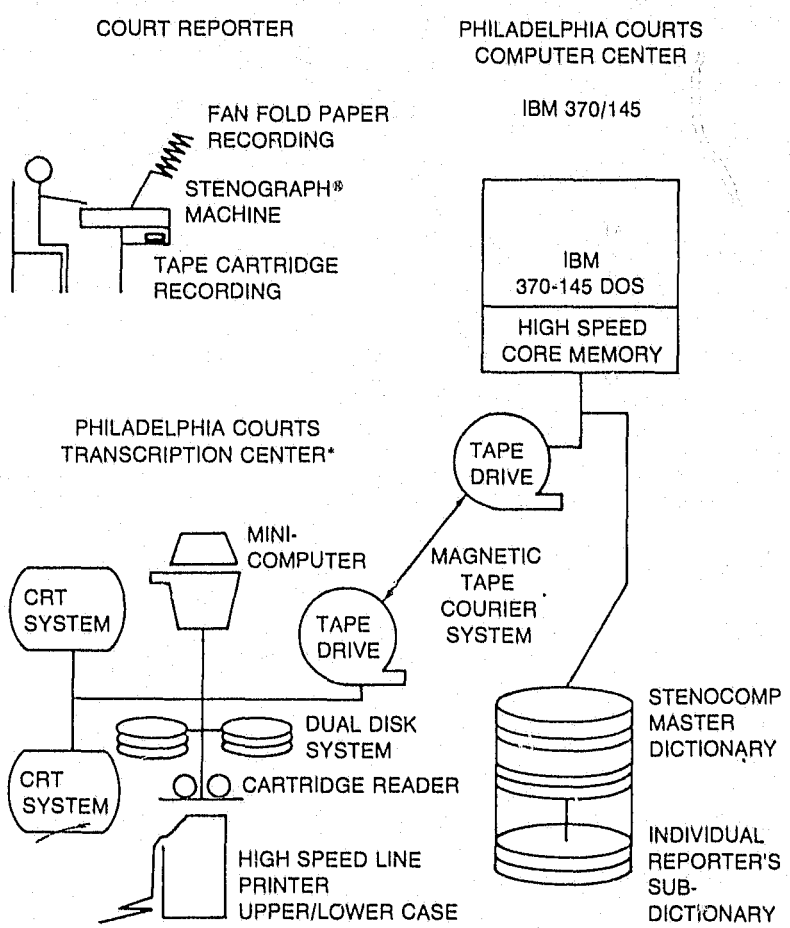
[4] During the initial four months, the first-run translation fee was completely subsidized. During the final six months of operation, the court paid the total fee.

[5] The court contracted with Stenocomp for continued CAT services and will charge court reporters 65¢ per page for the final transcript (original plus five copies) in order to cover the bulk of service center costs.

[6] Unfortunately, the reporters were not selected according to their transcript request volume. A number of reporters were in low volume courts or motions courts, where transcripts are not often necessary.

[7] Although these cartridge devices were adequate, many reporters found the device cumbersome and unreliable. All CAT vendors have now adopted cassette recorders, which are more portable and reliable recording devices.

Figure 4.1
Philadelphia Court
Computer Transcription System



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*The Philadelphia text-editing subsystem includes the following: a Data General Nova 1200 minicomputer processor (24k core storage); Diablo 2.4m byte dual storage disks; an Iomec 312 input cartridge reader; two Beehive SuperBee CRT terminals (intelligent and programmable terminals); a Data Products 2310 line printer (a medium speed, 250 to 300 lines per minute [1pm] printer) in which continuous form transcript paper is used: one-ply copy for first-run transcripts and three-ply copy (8½ by 11) for final transcripts; a Wangco nine-track tape drive (communication link to the translation computer); and an off-line decollator and burster (used to separate carbon copies and cut transcript pages).

onto a nine-track tape (not a cassette), and sending the nine-track tape to the court's main IBM computer for first-run translation.

First-Run Translation. Normally, the first-run translation was produced overnight on the court's computer. Occasionally, however, daily copy was produced during the day.

The job sheet information, the court reporter's individualized dictionary, and the universal dictionary were all used during translation of the reporter's stenotype notes. The first-run translation of these stenotype notes was then transferred onto nine-track tape and returned to the text-editing service center.

Usually on the morning of the next work day, the nine-track tape containing the first-run English translation was returned to the CAT service center. There, the tape was mounted on the text-editing subsystem's tape drive and the translation was

transferred to the disk storage. First-run transcripts were then printed on the subsystem's line printer and held for court reporter pickup.

Reporter Proofread-Editing. The court reporter usually picked up his first-run transcript within one or two days. After reviewing the first-run transcript and making appropriate proofreading notations at his own pace, the reporter returned the first-run transcript to the CAT service center for CRT text-editing. First-run translation accuracy varied by reporter and case. The most proficient CAT reporters consistently achieved 97 to 98 percent accuracy on their first-run translations.

CRT Text-Editing and Final Printing. Most text-editing operators edited approximately thirty to thirty-five pages per hour. After approval by the reporter, the final transcript was printed twice, using three-part continuous transcript paper to produce six transcript copies. An off-line burster and decollator separated the pages, and service center personnel bound the final transcript copies for the court reporter.

Evaluation

Methodology. Like most trial courts, the Philadelphia court had not adequately monitored, regulated, or assessed its current transcription process.[8] That is, there was no tracking or information system, there were no transcription standards, and there existed no statistical analysis. Without regulations, each court reporter was allowed to establish personal transcript production norms. Some court reporters made conscientious efforts to achieve statutory deadlines; others were consistently delinquent.

In January 1976, an elaborate data collection and evaluation procedure was implemeted in the CAT service center for assessing its production. These production logs continuously monitored each CAT transcript at each step of the CAT process. Transcript files for each court reporter were also maintained to sufficiently document the CAT project. The following information was collected for each transcript: (1) court reporter identification, (2) transcript size for both the first-run and the final transcript, (3) type of proceeding (civil or criminal), and (4) dates of key steps in the CAT process (e.g., request date, first-run translation date, reporter resubmission date, text-editing dates, and final transcript production date). Extensive data were also collected on CRT text-editing production norms and weekly production for first-run translations, CRT text-editing, and final transcript production. CAT production costs were documented from vendor-submitted payables, vouchers, and records of the court.

To obtain sufficient data on transcript production using both CAT and traditional transcription methods, the National Center staff assisted the Philadelphia court administrative office in developing forms and data collection procedures to monitor transcript requests, production, and filings.[9] Transcripts had not been monitored before August 1976; therefore, there were no accurate statistics on transcript production. Finally, in August 1976, the court instituted an information system which gathered and monitored the following information for each transcript: trial completion date, transcript request date, case identification number, type of proceeding (criminal or civil), court reporter name and identification, estimated completion date, estimated transcript size, actual transcript filing date, and actual transcript length.

Over 1,400 transcript orders were filed and monitored between August 1976 and January 1977. Of these, only 950 were used in the analysis which was applied to criminal transcripts of over ten pages in length and discussed below. The sample can be described as follows:

Number of criminal transcripts	
over 25 pages	600
10 to 25 pages	350
under 10 pages	150
Number of civil transcripts	300
Total	1,400

Analysis of Historical Transcript Production. While transcripts had never been adequately evaluated with respect to production time, all transcripts submitted for criminal appeals were stored by the clerk of the court. Transcripts selected were produced in 1975 or early 1976, before the inception of the Philadelphia CAT system, and were limited to serious felony trials (jury and nonjury) since motions for a new trial or in arrest of judgment are filed within seven days of a guilty verdict. All the

[8] While statutes and court rules have been promulgated specifying transcript time limits, these rules were generally disregarded and not enforced, except for extremely delinquent transcripts (those transcripts several months past the transcript filing date).

[9] The court administrative office originally agreed to institute such a transcript monitoring program at the beginning of 1976. However, owing to reporter complaints, administrative procedures, and delays, the monitoring and data collection system was not finally instituted for all court reporters until August 1976. Once the transcript monitoring program was instituted, most court reporters were responsive and provided the necessary documentation.

transcripts sampled by the project were at least twenty-five pages in length. While transcript order dates were not available, these cases provided an objective basis on which to calculate the normal transcript production time. The two principal objectives in collecting these historical data were (1) to calculate overall transcript production time prior to the CAT project (since transcripts from only felony trials were tabulated, the sample is biased toward lengthier transcripts), and (2) to compare transcript production time prior to the CAT project for the fifteen selected reporters and for other stenotype reporters when traditional transcription methods were used.

Several hundred transcripts were examined to collect the following information: name of reporter, case number, type of proceeding (jury trial, nonjury trial, motion), nature of charge (murder, rape, aggravated assault), transcript length, date of trial completion, and date of transcript filing with the clerk of the court.

Statistical Results. *Transcript production time.* The statistical results with respect to transcript production time led to the major conclusion that CAT can dramatically improve transcript production and reduce transcript delays. The conclusion is supported by three findings:

First, the average transcript production time for CAT is 50 percent less than by traditional transcription methods (18-day average for CAT; 37.6-day average for manual methods).

Second, for transcripts under 200 pages (about half of all transcripts), the average transcript production time for CAT is 67 percent less than by traditional transcript methods.

Third, the following relationship was found between production time and completion of transcripts by CAT and manual transcription techniques:

Percentage of Transcripts Completed

Time Required	*CAT*	*Manual*
15 days or less	52%	22%
30 days or less	86%	51%
60 days or less	99%	84%

A fourth finding was that, before the initiation of the Philadelphia CAT project, no significant difference existed between the transcript production times of reporters selected for CAT and the other court reporters.

Analysis of traditional production. Since the study analyzed and compared CAT and nonCAT transcripts, analysis of medium to long transcripts was the most relevant—only three or four CAT transcripts were less than twenty-five pages in length. However, the short transcripts were also analyzed to determine production norms. The very short transcripts (under ten pages) were not fully evaluated for this study, although the raw data indicate extended production times.

Figure 4.2 summarizes the transcript delivery times for the traditional transcript methods during the last half of 1976. Transcripts required an average of 37.4 calendar days to complete. Only 22 percent of these transcripts were produced within fifteen days of the transcript request notice, and only 51 percent of the transcripts were produced within thirty days. The length of the transcript was related to the transcription time: transcripts under 200 pages averaged approximately thirty-five days to produce, while transcripts over 300 pages in length normally took more than sixty days to produce (see Figure 4.2a).

A separate analysis of short transcripts is shown in Figure 4.3. Even relatively short transcripts produced by traditional transcription methods typically required twenty-six days to produce, with fewer than half of such transcripts filed within fifteen days of transcript notice and only 68 percent filed within thirty days.

Analysis of CAT production. An average of eighteen calendar days was needed to produce a typical CAT transcript (see Figure 4.4), regardless of transcript length, reporter first-run translation accuracy, or production delays. Eighty-six percent of all CAT transcripts were produced within thirty days of transcript order, 95 percent within forty-five days, and 99 percent within sixty days. Transcript length had a minimal effect upon production time except for short transcripts; i.e., those transcripts of fewer than fifty pages normally could be produced within ten days.

Unlike traditional transcript production times, CAT production times are not unduly extended by transcript length. There were at least five transcript requests for daily copy of normally 75 to 100 pages in length. All these high-priority requests were prepared and delivered to litigants within the prescribed time limit; i.e., by 9 a.m. the following day.

Between March and December 1976, over 100 transcripts totalling over 25,000 pages were produced on the CAT system. Three separate time periods were calculated for CAT production: (1) the total processing time from transcript order date to completion date, (2) the time taken by the court reporter to review the first-run transcript (time between court reporter receipt and resubmission of first-run tran-

script), and (3) the time taken by the CAT service center (aggregate time for processing and providing first-run translation to the reporter). With few exceptions, the average number of calendar days by the court reporter to review his first-run transcript was twice the average time taken by the court's service center (six days).

This analysis measured the number of *days* taken by each group, not the number of *hours* required by the court reporter to review and note first-run transcript errors or by the service center for processing. The actual production capability for most CAT reporters reviewing first-run transcription was normally thirty to forty-five pages per hour. No review production standards nor time limits for transcripts resubmission, however, were established for the court reporter. This led to large variations in reporter review time. This major time delay reflected, in many instances, poor utilization of reporter's time. No concrete justification was given by reporters for delays in reviewing and resubmitting first-run transcripts. If court reporters followed the recommended first-run translation review norms,[10] an estimated 75 percent of CAT transcripts could be produced within fifteen days, 95 percent of transcripts produced within thirty days, and all CAT transcripts produced within forty days of transcript notice.

While short transcripts (ten to twenty-five pages in length) are not reviewed necessarily as an efficient use of CAT systems, the data displayed in Figure 4.3 for such transcripts indicate that although CAT transcript cost might be somewhat higher, transcript production time can be reduced by 75 to 80 percent; i.e., from twenty-six days with traditional methods to an average seven days or less with CAT.

Analysis of preproject transcript production. The successful CAT reporter must have skills compatible with CAT. Many investigators have assumed that reporters most adaptable to CAT are generally the more proficient and accurate reporters, regardless of the transcription method employed.

In the Philadelphia project, however, the vendor's choice of fifteen reporters was based on their high probability of being compatible with CAT. It was assumed that these reporters were more capable and productive than reporters not chosen for the project.

The analysis of criminal transcripts produced prior to the CAT project provides some surprising results. Figures 4.5 and 4.6 clearly indicate that in terms of speed in producing transcripts, no significant time differences existed between the CAT reporters (who

[10] See Chapter 5.

Figure 4.2
Percentage of Transcripts Completed within the Specified Time Periods (Philadelphia)

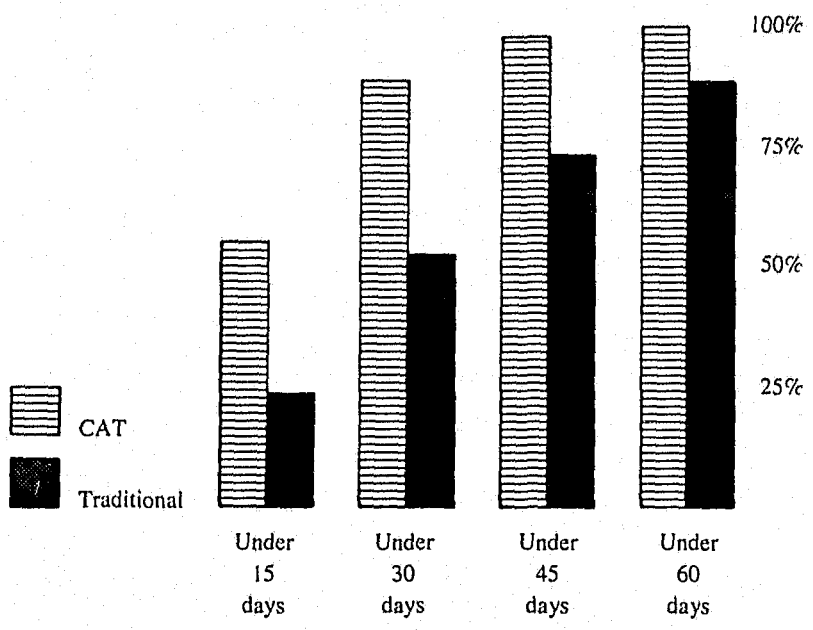

Figure 4.2a
Transcript Production
Type of Cases: Criminal
Traditional Transcription Methods (August to December 1976)

Size of Transcript (Pages)	*Days for Transcription: Request Date to Completion Date*								*Total Transcripts*	*Average No. of Days*
	1-15	*16-30*	*31-45*	*46-60*	*61-75*	*76-90*	*91-120*	*121+*		
25-49	55	70	46	23	10	9	4	6	223	33.5
50-99	33	50	20	23	7	4	1	3	141	32.9
100-149	16	19	15	11	3	4	2	1	71	36.7
150-199	3	8	8	3	3			1	26	41.0
200-299	6	11	8	6	3	1		1	36	36.5
300-399	6	3	5	5	3			2	24	50.3
400-499	1		1	1	1	3		1	8	67.0
500+	1		4	5	6	4	3	6	29	69.8
Total	121	161	107	77	36	25	10	21	558	37.4 days (Average)
Percentage of Transcripts	22%	29%	19%	14%	6%	4%	2%	4%		
	51%									

Figure 4.3
Transcript Production of Small Transcripts[a]
Prepared by Traditional Transcription Methods
August to December 1976

Days Required[b]	*No. of Transcripts*	*Percentage of Total*
1-7	45	15%
8-15	89	29
16-23	53	17
24-30	21	7
31-37	32	10
38-45	19	6
46-53	20	6
54-60	9	3
61-90	14	5
90+	8	3
Total	310	100%
Average time required: 26 days		

[a]Transcripts were ten to twenty-five pages in length.
[b]From date of request to completion date.

averaged seventy-nine days for transcript completion prior to CAT) and the nonCAT reporters (who averaged seventy-eight days for transcript completion). Only 25 to 35 percent of transcripts were completed within forty-five days and only 40 to 50 percent within two months.

The assumption that CAT reporters will complete transcripts in a more timely manner regardless of transcription method is thus proven false. The statistical results indicate that CAT reporters in Philadelphia were typical of the total Philadelphia reporter population in terms of transcript production capability. The major differences in transcript production time between CAT and traditional production methods result primarily from the introduction of CAT.

Transcript costs. The major conclusion resulting from the analysis of transcript costs was that CAT can be economically feasible, and CAT costs can be approximately equivalent to traditional transcription methods. The conclusion is supported by the finding that in the initial demonstration year the per-page cost for transcripts in the Philadelphia CAT project was $1.77 ($1.14 if the court's noncash outlays are deducted), and by the further finding that, projecting full operating costs under new pricing conditions, the

Figure 4.4
Transcript Production by Computer-Aided Transcription
March 1976 to December 1976

No. of Pages in Transcript	*Days Needed for Transcription*[a]				*Total No. of Transcripts*	*Avg. No. of Days*	*Days Required for*	
	1-15	*16-30*	*31-45*	*46+*			*Court Reporter*	*Service-Center*
25-49	15	4			19	10.4	6.8	3.6
50-99	14	10	2	3	29	22.1	16.1	6.0
100-149	7	5	2	1	15	18.1	13.3	4.8
150-199	3	4	1		8	17.4	7.8	9.6
200-299	5	5	1		11	17.4	11.3	6.1
300-399	5	2	3		10	19.7	10.2	9.5
400-499	4	4			8	14.6	7.7	6.9
500+	1	1	1	1	4	28.8	25.0	3.8
Totals	54	35	10	5	104	18.0	12.0	6.0
Percentage of transcripts	52%	34%	10%	4%				
	86%							

[a]Request date to completion date.

Figure 4.5
Transcript Production[a]
Preceding CAT Project
NonCAT Reporters

No. of Pages in Transcript	*Days Needed for Transcription*[b]								*Total No. of Transcripts*	*Avg. No. of Days*
	1-15	*16-30*	*31-45*	*46-60*	*61-75*	*76-90*	*91-120*	*120+*		
1-100[c]	5	10	9	4	7	3	4	2	44	53
101-200	4	14	7	7	3	4	4	4	47	58
201-300			8	7	4	6	3	6	34	92
301-400		2	1	2	6		4	3	18	92
401-500	1	2	1	4	3	4		3	18	96
501-600							2	5	7	186
601-700			3	2	1	1	1	2	10	78
701-1000				1	3	6		1	11	82
1000+		1		3	1		4	2	11	88
Totals	10	29	29	30	28	24	22	28	200	78
Percentage of transcripts	5%	15%	15%	15%	14%	12%	11%	14%		

[a]Types of cases included criminal jury and nonjury (waiver) trials.
[b]Trial date to completion date.
[c]All transcripts sampled were at least twenty-five pages.

per-page cost should be $.67 if 100,000 pages of transcripts are produced annually.

Break-in costs. Operating cost figures were calculated in two ways for the Philadelphia CAT project.[11] In Figure 4.7, the $1.77 per-page figure represents the estimated production costs during the demonstration project, according to the pricing structure and contractual agreement in effect in April 1975. This calculation includes costs allocated to this project for some services and facilities normally provided by the court (e.g., computer time, space, paper supplies). The $1.14 per-page figure results from the actual CAT expenses, but excludes those expenses charged to other court budgets. An additional $.33 per page is needed to amortize start-up expenditures, although these costs might be written off.

The following factors contributed to abnormally high transcript production costs: unrealized production potential, short-term leasing, and project uncertainties. Although the CAT system could handle up to 150,000 transcript pages per year, only 40,000 pages were produced during the demonstration pe-

[11] See Figures 4.7 and 4.8. All cost estimates follow the methodology described in Chapter 3.

Figure 4.6
Transcript Production[a]
preceding CAT Project
CAT Reporters

No. of Pages In Transcript	*Days for Transcription* [b]								*Total No. of Transcripts*	*Avg. No. of Days*
	1-15	*16-30*	*31-45*	*46-60*	*61-75*	*76-90*	*91-120*	*121+*		
1-100[c]		5	3	3	4	1	2	4	22	73
101-200		3	2	3	1	3	1	1	14	65
201-300		2		1	2	1			6	56
301-400		1	1	3	1	2		2	10	73
401-500				1			2	1	4	115
501-600					1		1	1	3	108
601-700			1				1	3	5	128
701-1000			2	1	1	2	1	1	8	87
1000+							1	1	2	133
Totals		11	9	12	10	9	9	14	74	79
Percentage of transcripts	0%	15%	12%	16%	14%	12%	12%	19%		

[a]Types of cases included criminal jury and nonjury (waiver) trials.
[b]Trial date to completion date.
[c]All transcripts sampled were at least twenty-five pages.

riod. Owing to the uncertainty of the project's duration, a short-term equipment lease was signed with the vendor instead of a purchase or long-term leasing agreement. Finally, additional funds were made available for vendor travel and personnel charges owing to potential developments and implementation problems. Since this was the first major test of a CAT system in a court facility, additional expenditures were necessary for proper implementation and operation.

Long-term costs. Figure 4.8 depicts the costs at a more realistic production level, projected in the next few years to be an estimated 100,000 pages per year by the Philadelphia system. Start-up costs are now estimated at $.28 per page and the operating costs at $.67 per page. If the noncash outlays are excluded, the operating cost figure is reduced to $.36 per page. At this volume, a total cost outlay of $.64 per page (start-up plus operating costs) is estimated for fully operating the CAT system.

A comparison of Figures 4.7 and 4.8 shows the sharp contrast between srart-up and normal operating costs. Several reasons exist for this difference. The royalty fee, recently renegotiated, was lowered by nearly 50 percent. The text-editing equipment was calculated on an amortized purchase rather than a short-term rental agreement. The court has exercised the purchase option on the original rental agreement. The transcript volume can be doubled or tripled with relatively small increases in most costs—e.g., space (no increase), text-editing system (no increase), administration (no increase). The text-editing operators can produce higher transcription volumes since they were underutilized during the project.

The original CAT contract between Stenocomp, Inc. and the Philadelphia court was terminated on December 15, 1976. However, the court and the court reporters negotiated a new contract, again with Stenocomp, to continue producing CAT transcripts. The cost to the court reporters was increased from a subsidized $.50 per page during the demonstration project to $.65 per page to cover CAT expenditures.[12]

The court and the court reporters desired to continue CAT for several reasons. They realized that the CAT system had been underutilized, in part because reporters were not totally committed to CAT (owing to the uncertainty of the project's continuation) and the unreliability of the vendor's training program for reporters. Also, the normal production cost for CAT was found to be competitive with the traditional transcription methods. Several cost items, such as space and supplies, were already budgeted by the court for any transcription method and, therefore, would merely be a cost reallocation to the CAT system from manual transcription expenditures.

Reporter utilization. A third major conclusion was that, unlike some reporters using traditional tran-

[12] By statute, the total cost of a criminal transcript to the courts and government is $1.60 per page (original and five carbons are provided). The production costs among Philadelphia court reporters using a conventional transcription method were unavailable.

Figure 4.7
Cost Checklist

Project Name: Philadelphia CAT Project (Actual Operations)
Project Duration: 16 months (14 months of operation)
No. of Pages: 40,000

Cost Element	Start-Up Costs: Cost	Start-Up Costs: Per-Page Cost	Operating Costs: Cost	Operating Costs: Per-Page Cost	Explanation[a]
1. Reporter selection	–0–	–0–			Footnotes Follow
2. Stenotype devices					
Purchase	$28,500	.24			
Rental			–0–	–0–	
Maintenance			–0–	–0–	
3. Reporter orientation, etc.	4,000	.02	3,125	.08	
4. System installation	2,500	.01			
5. Staff training	1,250	.01			
6. First-run translation					
Royalties			12,800	.32	
Equipment charges			2,800[b]	.07[b]	
Personnel			–0–	–0–	
Supplies	3,000	.02	400[b]	.01[b]	
Mailing			–0–	–0–	
7. Text-editing					
Equipment charges	–0–	–0–	21,504	.54	
Personnel			8,000	.20	
Supplies			–0–	–0–	
Mailing			–0–	–0–	
Reporter time			Not assessed		
8. Transcript production					
Personnel			–0–	–0–	
Supplies			2,000[b]	.05[b]	
Mailing				–0–	
9. Administration			14,000[b]	.35[b]	
10. Miscellaneous					
Overhead			–0–	–0–	
Space and utilities			6,000[b]	.15[b]	
Other	5,125	.03	–0–	–0–	
Totals	$44,425	$.33/page	$70,629 (45,429)	$1.77/page (1.14/page)	

[a] E.g., operating costs = monthly costs × number of months.
[b] Court-provided ("free") expenses.

Explanatory notes to cost checklist items:

1. Reporter selection: Included in reporter orientation.
2. Stenotype devices: $1,900 per device times 15 devices, prorated over 36 months.
3. Reporter orientation and dictionary compilation: $500 per certified reporter times 8 reporters certified, prorated over a 5-year project life. Lexicographic support: 25 days of consulting ($125 each).
4. System installation: Delivery costs ($1,875) plus 5 days of consulting ($125 each), prorated over a 5-year system life.
5. Staff training: 5 days consulting ($125 each) plus a week of staff salaries ($625), prorated over a 5-year project life.
6. First-run translation:
   - Royalties: Per-page agreement with Stenocomp (now $.12 less).
   - Equipment: Court-provided computer services, estimated at $.07 per page.
   - Personnel: First-run work performed by supervisor and included in Administration.
   - Supplies: $3,000 in tapes and disks, prorated over five years plus a nominal charge of $.01 for inexpensive computer paper.
7. Text-editing:

Equipment: Since the lease purchase option was exercised, the project incurred the following costs:

$ 7,700 (nonequity lease costs—25 percent of 14 months at $2,200 per month)
4,704 (14 months at $336 per month), plus
9,100 ($39,000 purchase, prorated over 5-year system life)

$21,504

Personnel: Estimated from available time sheets.

8. Transcript production:
   Personnel: Negligible effort required.
   Supplies: Court-supplied. Continuous form, multi-part sheets plus binders cost—in aggregate—$.05 for each page of transcript (an original and five copies).
9. Administration: Court provided a full-time person. She could easily handle three times the staff.
10. Miscellaneous: Court provided free space and utilities, estimated at $6,000. Twenty-five days consulting ($125 each) and $2,000 travel, spent on miscellaneous activities, are prorated over a 5-year system life.

Figure 4.8
Cost Checklist

Project Name: Philadelphia CAT Project (Anticipated Production Capabilities)
Project Duration: 14 months (12 months of operation)
No. of Pages: 100,000 (minimal)

	Start-Up Costs		*Operating Costs*		
Cost Element	*Cost*	*Per-Page Cost*	*Cost*	*Per-Page Cost*	*Explanation*[a]
1. Reporter selection	–0–	–0–			Footnotes Follow
2. Stenotype devices					
Purchase	$26,250	.09			
Rental			–0–	–0–	
Maintenance			–0–	–0–	
3. Reporter orientation, etc.	7,500	.02	1,875	.02	
4. System installation	2,500	Negligible			
5. Staff training	1,300	Negligible			
6. First-run translation					
Royalties			17,000	.17	
Equipment charges			7,000[b]	.07[b]	
Personnel			–0–	–0–	
Supplies	3,000	.02	1,000[b]	.01[b]	
Mailing			–0–	–0–	
7. Text-editing					
Equipment charges	60,000	.12	3,600	.04	
Personnel			12,800	.13	
Supplies			–0–	–0–	
Mailing			–0–	–0–	
Reporter time			Not assessed		
8. Transcript production					
Personnel			–0–	–0–	
Supplies			5,000[b]	.05[b]	
Mailing			–0–	–0–	
9. Administration			12,000[b]	.12[b]	
10. Miscellaneous					
Overhead			–0–	–0–	
Space and utilities			6,000[b]	.06[b]	
Other	2,875	.03	–0–	–0–	
Totals	$103,425	.28	$66,275	$.67/page	
			(35,275)	(.36/page)	

[a] E.g., operating costs = monthly costs × number of months.
[b] Court-incurred expenses.

Explanatory notes to cost checklist items:

1. Reporter selection: Included free of charge by vendor.
2. Stenotype devices: $1,750 per device times 15 devices, prorated over 36 months.
3. Reporter orientation package: $500 per reporter times 15 reporters, prorated over a 5-year project life. Lexicographic support: 15 days of consulting ($125 each).
4. System installation: Delivery costs (1,825) plus 5 days of consulting ($125 each), prorated over a 5-year system life.
5. Staff training: 5 days consulting ($125 each) plus a week of staff salaries ($625), prorated over a 5-year project life.

6. First-run translation:
   Royalties: Current rate in Philadelphia.
   Equipment: Court-provided computer service, estimated at $.07 per page.
   Personnel: First-run work is done by supervisor. Thus included in Administration.
   Supplies: $3,000 in tapes and disks, prorated over 5 years, plus a nominal charge of $.01 for inexpensive computer paper.
7. Text-editing:
   Equipment: The purchase price of the subsystem, prorated over a 5-year system life, plus monthly maintenance.
   Personnel: $4 per-hour text-editors can do 250 pages per day, roughly 35 pages per hour when working without interruption (about 30 pages per hour including breaks).
8. Transcript production:
   Personnel: Negligible effort required.
   Supplies: Court-supplied. Continuous form, multi-part sheets plus binders cost—in aggregate—$.05 for each page of transcript (an original and five copies).
9. Administration: Annual salary of one person.
10. Miscellaneous: Court provided free space and utilities, estimated at $6,000. Fifteen days consulting ($125 each) and $1,000 travel, prorated over a 5-year system life.

scription methods, CAT reporters very seldom need to be relieved from their courtroom duties in order to work on a transcript backlog.

The availability of court reporters for the courtroom is an important consideration. A large number of court reporters in the Philadelphia courts, particularly those assigned to criminal proceedings, had many orders for transcripts. The court provides temporary replacements to allow some of these reporters to reduce their transcript backlogs. The lost courtroom time for each reporter averaged from 15 to 25 percent of worktime. For reporters using CAT, no replacements were necessary to complete transcripts, including daily or expedited copy requests. The record of CAT reporters strongly suggests that, even in high-volume courts or for cases with long transcripts, no additional or supplemental court reporters are necessary to reduce or ultimately eliminate the transcript backlog. The potential savings on court reporter personnel can thus be substantial. The Philadelphia court employs ten pool reporters to replace reporters unavailable for courtroom duty, and a manpower reduction of just four or five reporters can reduce reporting expenditures by more than $150,000 annually.

Other CAT Projects

Several jurisdictions have initiated CAT programs in the past two years: Baton Rouge, Cincinnati, Dallas, Tucson, Detroit, and the Federal District Courts under the sponsorship of the Federal Judicial Center. A review of each jurisdiction's CAT project is contained in Appendix B.

The following sections summarize the major findings and conclusions among these CAT projects.

Project Development

Major findings concerning project development were: (1) most projects were adequately funded; (2) several projects prematurely implemented CAT (i.e., CAT vendors or equipment manufacturers sold CAT services before their equipment or computer software had been perfected); (3) several projects implemented CAT without an analysis of transcript and court reporting problems; (4) several projects prematurely selected a service approach without sufficient analysis of their needs; and (5) many projects unsystematically and inadequately selected court reporters to participate in CAT.

Project Implementation

Six conclusions can be made from our investigation of project implementation: (1) All projects had difficulty in fully implementing and operating CAT; (2) Several projects experienced frequent equipment malfunctions and inadequate vendor maintenance; (3) All projects revealed inadequate administrative procedures and policies, and none had production norms or standards for court reporters or court personnel; (4) Most projects were insufficiently managed by the court or court reporters; (5) Several projects did not develop or enforce time schedules to ensure prompt delivery of vendor services or equipment; (6) Several projects were not provided with adequate vendor training programs for their court reporters.

Project Results

With respect to results, our findings were as follows: (1) most projects found CAT to be technically feasible; (2) most projects did not collect

sufficient data to comprehensively evaluate CAT capabilities; (3) no projects sufficiently compared CAT production and costs to traditional transcription methods; (4) few projects compared transcription time between CAT and nonCAT methods; (5) no projects provided adequate cost figures on CAT; (6) most projects reported that CAT provided transcripts of good to excellent quality; (7) most projects reported that CAT transcript formats were flexible and adaptable to most court and court reporter format preferences; and (8) most projects were highly satisfied with their modified stenotype (cassette) devices.

5. MANAGEMENT OF COMPUTER-AIDED TRANSCRIPTION

Introduction of computer technology into a court is a complex task. Implementation of a novel computer application, such as computer-aided transcription, may be particularly formidable. The degree of success in implementing a CAT system will correspond to the degree of careful preparation and management by the user. Successful management involves the suitable design, selection, installation, and implementation of CAT.[1]

As reviewed in Chapter 4 and Appendix B, several courts which attempted to implement CAT experienced difficulty in selecting an appropriate CAT service and managing it. This chapter should assist users in better planning and managing CAT.

No ideal CAT system is available. As CAT becomes better established, the variety of CAT services will expand and the number of companies offering CAT systems will grow. The three basic CAT service approaches—vendor, user, and hybrid—are already merging. For example, a court might simultaneously be a user, providing a CAT system for official reports, and a vendor, providing CAT services to other jurisdictions under a licensing agreement.

Program Design

Before acquiring CAT, a user should comprehensively determine his needs and properly design a system. This process includes five steps:

1. Needs analysis: a systems analysis of court reporting services, particularly an assessment of transcript demand, transcript backlog, and the utilization of stenotype reporters.

2. Selection of production approach: the selection of the most feasible CAT production and service approach, or at least the narrowing of the most feasible CAT options.

3. Request for proposal: the preparation of a request for vendor bids.

4. Proposal evaluation: the evaluation of proposals submitted by vendors.

5. Reporter selection: the survey and selection of stenotype reporters suitable for CAT.

Needs Analysis

Before selecting a CAT vendor or choosing any production approach, the court must analyze its present court reporting services to determine whether CAT is an appropriate solution. The following information about court reporting services should be known before CAT is assessed:

—the statutory time limits for filing transcripts.
—the percentage of transcripts submitted after the statutory filing time limit.
—the average number of days needed to complete a transcript (measured either from the trial date to the transcript filing date or from the order date to the transcript filing date).
—the annual volume of appeals, in terms of both the number of transcripts and the total number of transcript pages.
—the distribution of transcripts among reporters.
—the percentage of criminal appeals and civil appeals.
—the amount of daily copy (transcripts requested the following day) or expedited copy (transcript prepared within forty-eight to seventy-two hours after the proceeding).
—the cost of court reporting services to the court (court reporter salaries and fringe benefits, office space, supplies, transcript fees paid by the court or government agency).
—the cost of court reporting services to litigants.
—the transcript backlog and the transcript production times for the court reporters.

CAT will require a major investment in financial and personnel resources. This analysis should be completed in each jurisdiction to ensure that CAT offers a practical solution, and to help limit the type of CAT services which might be seriously considered. Unfortunately, few courts or court reporters have collected such information.

[1] The management of transcript production is more complex than most court managers realize. To understand how management of CAT fits into the management of reporting services, see Michael Greenwood and Douglas Dodge, *Management of Court Reporting Services* (Denver: National Center for State Courts, 1976).

Selection of Production Approaches

Several criteria can be used to narrow or limit the CAT service approaches considered for a particular jurisdiction. Six criteria are of particular importance: (1) the number of stenotype reporters using a CAT system; (2) the availability of financial resources; (3) the availability of adequate computer facilities in the jurisdiction; (4) the location of the court; (5) the estimated pages of annual transcript production and (6) the statutory and practical transcript time standards.

Number of Stenotype Reporters. One CAT system can support many reporters. However, the number of stenotype reporters using CAT significantly affects which type of CAT service is most appropriate for a particular locality or organization. Technical capabilities, costs, and transcript volume capacities affect the suitability of equipment configurations and service approaches for reporting groups of varied sizes. Figure 5.1 summarizes the preferred service choices according to the number of reporters to be served.

For individuals or small reporter groups (one to five reporters), the vendor-operated service, located at a national, regional, or local service center by a vendor or a centralized court facility, may be the most feasible. If transcription volume is sufficient (30,000 to 50,000 transcript pages annually), a standalone user operation system can be considered.

For moderate sized groups (six to ten reporters), nearly all service options are feasible. Several other criteria—in particular, annual transcript volume, financial resources, and the availability of local computer facilities—will be more critical in determining the most suitable CAT approach.

In reporter groups of more than ten reporters, the economies of scale in terms of both personnel and potential transcript volume indicate that a user-controlled (classical) or hybrid system will be the most economical and technically feasible. At the present time, a standalone CAT system would be ineffective and inefficient. The choice between a hybrid or user-controlled system in a particular jurisdiction will depend on whether a large-scale computer system is available within the court or county facility and whether a CAT vendor will provide the translation software package to the court. In either case, a minicomputer system would still have to be purchased or rented to preprocess the cassettes for translation and to perform text-editing functions.

Availability of Financial Resources. To start a CAT system, the initial funding requirement for twelve to eighteen months will range up to $10,000 per court reporter. While federal or state grants may be available to help defray portions of the start-up costs, continuing costs per reporter will be several thousand dollars annually. A substantial portion of the CAT service costs will be defrayed by the transcript fees.

Availability of Computer Facility. Computers perform two functions for CAT: first-run translation and electronic text-editing. Some courts may have computer time available on a large-scale computer system, most frequently on a county or state time-sharing facility or the court's in-house computer. At least one CAT vendor will provide and install the first-run translation software package on a court's computer for a fee. The availability of such a translation service may provide substantial transcript cost and time savings.

A few courts have experimented with text-editing systems (such as the IBM–ATMS text-editing package) on available medium or large-scale computers, but these general text-editing packages have been unsatisfactory for CAT production. Therefore, at this time, users should purchase a text-editing subsystem developed or approved by a CAT vendor.

Location. Rural or sparsely populated court jurisdictions will be limited to vendor-controlled or possibly standalone service. This is due primarily to low transcript volume or unavailability of appropriate maintenance services.

Speed of Transcript Production. When delivery by mail is relied on between user and a computer facility, CAT production within forty-five days cannot be assured or controlled. The user may blame the vendor; the vendor may in turn blame the postal service.

Only a user-controlled or hybrid system with telecommunication linkage will assure fast first-run translation and text-editing. Using either of these approaches will permit transcripts to be finished within thirty days; smaller transcripts (under 250 pages) should be normally completed within fifteen days.

Amount of Transcript Production. Figure 5.1 relates the anticipated amount of transcript volume to the various types of CAT approaches offered.

Request for Proposals

Owing to the number of CAT vendors and the many service options, competitive bidding should be mandatory when a CAT system is being selected. The request for proposals (RFP) should be specific; otherwise, CAT vendors will have difficulty describing their services and providing accurate cost estimates. As previously mentioned, the courts must complete a needs analysis to determine the need for

Figure 5.1
Parameters for Determining CAT Service Approach

CAT Service Approach	No. of Reporters in Group			Annual Transcript Volume (pages)			
	1-5	6-10	11+	Under 10,000	10,000-50,000	50,000-150,000	150,000
Local vendor-controlled system or third-party license	X	X	X	X	X	X	
Standalone[a]	X				X		
Mailing to vendor-controlled service[b]	X	X		X	X		
Mailing to centralized court-controlled service	X	X		X	X		
Local, court-controlled CAT service center		X	X			X	X
Central, court-controlled translation center with vendor-provided (but user-controlled) text-editing subsystem		X	X			X	X
Hybrid CAT system, without vendor-developed text-editing subsystem[c]							
Hybrid CAT system, with vendor-controlled first-run translation and user-controlled text-editing subsystem		X	X		X	X	

[a] Users may consider multiple systems for additional reporter groups.
[b] Only recommended on a temporary basis.
[c] Not recommended.

CAT and to limit the service options under consideration.

Detailed below are RFP specifications which should be distributed to potential CAT vendors. A sample of the RFP used in selecting a CAT vendor for the Philadelphia Court of Common Pleas is attached as Appendix C. This sample should be used only as a guide. Each jurisdiction should tailor the RFP to meet its own needs.

Background Information. The following background information should be provided for potential CAT vendors:

—the number of reporters to be trained
—the number of stenotype devices needed
—the annual transcript volume anticipated (first-year CAT volume should be estimated at 30 to 40 percent of subsequent years' volumes, owing to the need for learning and perfecting the system)
—the anticipated timetable of events
—the preferred service options
—the geographic location(s) of the court(s) and court reporters who will utilize the CAT system
—the anticipated funding period
—the names and addresses of principal court managers.

This background information is easily provided after the needs analysis is completed.

Technical Information. Users should require the following technical information from potential CAT vendors.

1. Statement of the problem: Vendors should provide a statement of their background, management, and understanding of the user's problems. The background and management sections help in assessing how responsible the vendor is; the problem statement summarizes the vendor's proposed equipment and procedures and demonstrates his ability to assess program needs.

2. Description of proposed equipment: Proposed equipment and facilities for the vendor's CAT system must be described. Two elements are required—a description of the stenotype device and a description of the CAT system configuration.

Stenotype devices utilizing quarter-inch cassettes are normally purchased or rented from the CAT vendor. The vendor should describe the features of his stenotype devices and their maintenance needs. We recommend that users request information concerning portability (whether the unit is battery operatable), audible or visual warning signals for malfunctions, reasonable warranty or guarantee (approximately six months), and availability of quick repairs.

Vendors should specify the configuration of the CAT system they propose, including equipment make and model numbers, equipment capacities,

commercial operating systems, space and power needs, maintenance service and maintenance response time, and other characteristics. The exact nature of any communications hook-ups should also be described.

If the user desires to utilize available equipment and facilities, these should be carefully described with respect to such considerations as room dimensions, air conditioning and power, equipment make/model, operating systems, core capacity and partitioning, number of available data channels, and the like.

3. Description of proposed procedures: The CAT vendor should detail the basic operating procedures which will be encountered in normal operations.

Training Program Description. Each vendor proposal should contain a proposed description of the vendor's reporter training program with respect to the following:

1. Reporter selection: Reporter selection by vendors should be considered an integral component of reporter training. The vendor must describe his process of determining reporter compatibility with CAT.

2. Reporter orientation: The vendor should describe his program to orient reporters to the modified stenotype devices and the procedures of the CAT service. He should describe the amount of time and the work schedule for these activities.

3. Dictionary or profile compilation: The vendor should describe his program for dictionary or profile compilation. The amount of time (per reporter) and an approximate schedule are usually necessary.

4. Lexicographic support: The vendor should describe the extent and schedule of his lexicographic support program.

5. Travel required: If travel by the court reporters or vendor staff is necessary, an approximate schedule should be provided.

6. Reporter certification: Vendors should describe how long it will take before a reporter can be certified to a 95 percent first-run translation accuracy rate. We consider training periods over six months excessive. Users should clearly explain that full payment for reporter training is contingent upon attaining the 95 percent rate in a reasonable time. Incentives should be directed to the goals of certification within a reasonable time. These standards should be applied to all vendors.

Pricing Information. The CAT vendor should be required to provide detailed pricing for the following elements for each alternative plan:

1. Modified stenotype devices, including purchase and rental prices, maintenance costs, purchase option credits, etc.

2. Cassettes, giving the price per cassette including quantity discounts.

3. Court reporter training, specifying one-time and recurring costs for orientation, dictionary or profile compilation, lexicographic support, and reporter selection (when appropriate).

4. System supervisor and text-editor training, including costs to be incurred for consultants and travel.

5. System installation, stated as costs for equipment delivery, installation, and testing (both the translation and text-editing systems).

6. First-run translation, stated as per-page cost (when appropriate) for translation; if communication costs and mailing costs will be incurred by the user, the vendor should include an approximation of them.

7. Text-editing equipment, including system purchase or rental prices, maintenance costs, purchase option credits, etc.

8. Consulting fees, specifying additional costs for vendor consultant time and travel.

9. System supplies, giving separate pricing for necessary supplies such as transcript paper, printer ribbon, computer tapes and disks.

Delivery Schedule. Each vendor proposal should provide a full delivery schedule or work timetable to describe CAT implementation. The following deadlines are the minimum which should be described:

1. Delivery of modified stenotype devices.

2. Installation and testing of text-editing subsystem.

3. Installation and testing of translation software (if necessary).

4. Completion date of communications link between translation system and text-editing subsystem.

5. Start and finish dates for reporter training, e.g., orientation, dictionary, or profile compilation.

6. Dates for system operator and CRT text-editor training.

Proposal Evaluation

Although only one vendor may be able to provide desired CAT services, users should anticipate a number of CAT vendor responses to RFPs. The following criteria should be used to help select the best proposal:

1. The compatibility of proposed equipment and procedures with court reporting practices.

2. The total per-page CAT cost.

3. The vendor's capability to provide sufficient services—adequate translation, timely text-editing,

and responsive maintenance for stenotype devices and other equipment.

4. A suitable implementation schedule.

5. An effective and suitably priced training program; the primary effectiveness criterion is the ability of reporters to be certified to the 95 percent accuracy rate within six months.

6. The vendor's previous experience and reliability.

7. The location of vendor and maintenance staff.

8. The financial and managerial stability of the company.

Reporter Selection

Court reporter capabilities and workload should be assessed prior to the selection of a CAT production system. Four factors should be carefully analyzed, tested, and assessed: (1) reporter compatibility with CAT, (2) court reporter transcript request volume, (3) the type of court proceedings, and (4) reporter motivation.

Reporter compatibility. Most CAT vendors can test and evaluate a reporter's probability of successfully utilizing CAT. For a nominal fee, most vendors either provide standardized tests and style questionnaires or review sample stenotype paper notes to determine whether the reporter's note-taking style is compatible with CAT. The reporter's suitability should be rated on a three-category scale: high probability (reporter has good to excellent note-taking style and can be trained in less than two months to achieve high proficiency), moderate probability (fair to good note-taking style and, with some style changes, should be sufficiently trained within two to four months), and low probability (reporter style is incompatible and training time will be extensive, exceeding six months). An early assessment of each reporter's stenotype style will give both the court and the court reporter a realistic estimate of whether to consider CAT.

Transcript volume. Each court reporter must have a sufficient transcript volume to justify the cost and time expenditures for CAT. Unless the court reporter produces at least 2,500 transcript pages per year, the expenditure is unwarranted. Currently, we recommend a minimum production of 5,000 pages per year for each reporter to help ensure systems success and reasonable costs.

Types of proceedings. The type of court proceedings and cases may also limit the adoption of CAT. Longer transcripts are more suitable for CAT. For cases lasting less than fifteen to twenty minutes, CAT may not be advantageous since the average transcript length will probably be under twenty pages.[2]

Reporter motivation. Court reporters must be properly motivated. They should not only make a commitment to participate in a CAT project but also be willing to help defray start-up costs, and to eventually pay the entire cost for the CAT service, from their transcript fees.

System Start-Up

Implementation Schedule

It is difficult to establish an accurate time schedule. However, the following schedule, based in part on the experiences of several courts which have implemented CAT systems, may provide guidelines. Listed below are the principal CAT services and the estimated lead time requirements associated with each:

1. Delivery of stenotype devices: at least two months before the CAT system becomes operational.

2. Reporter training: to begin two to three months before CAT becomes operational and to be completed within three months after the system is implemented.

3. Initial dictionary compilation: to be completed within one month after the system is implemented. Lexicographic support and further improvement continue indefinitely.

4. Delivery and debugging of text-editing subsystem and telecommunications equipment: two to four weeks before the system becomes operational.

5. Testing of first-run translation: at least one week before system becomes operational for vendor-operated or hybrid approaches, and two to three weeks before system becomes operational for user-operated systems.

6. Training of computer operators and CRT text-editors: to begin at least one to two weeks before the system becomes operational and to take no more than two weeks to complete.

Reporter Training

The most crucial step in implementing CAT is court reporter training. No CAT system can function

[2] While this report primarily discusses transcripts for appellate review, there is also the prevailing problem of transcripts produced from grand jury proceedings and preliminary hearings which cause trial court delays. While transcripts from such trial court proceedings tend to be of short duration, the savings in time by using CAT may outweigh the additional CAT costs and reduction in CAT efficiency—this may be of particular concern with speedy trial policies.

properly without proficient court reporters. The most effective and productive CAT systems will fail when reporters produce inaccurate first-run translations.

It is strongly recommended that an economic incentive be placed upon the vendor to provide sufficient reporter training services to ensure reporter proficiency. This must include a rigorous and planned training program with specified proficiency standards to be achieved. A first-run translation accuracy rate of at least 95 percent is necessary, and the contract should specify that payment of a vendor for reporter training be contingent upon the achievement of that rate.

Production Procedures and Controls

Proper administrative procedures and controls are needed to operate CAT efficiently and to achieve high productivity. The following recommendations were developed in part from the experience in the Philadelphia demonstration project, a user-controlled system. However, most of these recommendations are appropriate regardless of the particular system or service approach adopted.

Job Submission

Job Sheet. With each transcript submitted for CAT processing, the reporter must submit a completed job sheet. The job sheet should contain at least the following information:

1. Reporter's name.
2. Case name and number.
3. Type of case—e.g., criminal or civil.
4. Trial date.
5. Estimated number of pages.
6. Number of cassette tapes.
7. Names of judge and participating attorneys.
8. Transcript priority—e.g., normal, daily copy, or expedited copy.
9. Additional dictionary notes: the stenoform and its English transliteration. This is a list of words or phrases related to the particular case—e.g., names, geographic locations, addresses, special titles, unusual medical or technical terms, or a new stenoform for commonly used words.

Information on the job sheet is needed to prepare the transcript cover sheet and index pages and to properly administer and evaluate CAT production.

Stenotype Cassettes. Each cassette containing the original stenotype notes should be properly labeled and identified by case number, case name, and court reporter. If more than one cassette tape is submitted for a particular case, the reporter must clearly indicate the sequence of cassette tapes.

Whenever possible, portions of the stenotype notes on the cassettes should be tested before the first-run translation to verify that the modified stenotype device's recording mechanism is properly operating, and to ensure that the stenotype notes were properly received by the computer.

Each court reporter should be provided with a one-month supply of cassette tapes. Reporters on a user-operated hybrid system need fifteen to twenty-five tapes; reporters on a vendor-operated or mailing service hybrid system require thirty to forty cassette tapes.

High-quality data cassette tapes, if properly handled, can be used for several years. Audio recording cassette tapes should never be used because quality is inferior for CAT application.

The reporter should retain his original paper stenotype notes of the proceeding so that, in the event of any failure in the CAT process, production of a transcript by a traditional method is possible.

First-Run Translation Production

A log book should be maintained to monitor the production of each CAT transcript. The monitoring process should begin when the reporter submits his cassettes and job sheet for CAT processing. The log book should contain the following information:

1. Case number and name.
2. Court reporter name or identification number.
3. Trial date.
4. Submission date of cassettes.
5. Number of first-run translation pages.
6. First-run transcript printout date.
7. Court reporter resubmission date (date the reporter completed his written corrections on the first-run transcript and returned it to computer facility).
8. Final printing date.
9. CRT editor name.
10. Number of final transcript pages.

CAT transcripts normally should be processed under a first-in, first-out approach so that transcripts submitted earliest are processed first. The time necessary for first-run translation will depend on the service approach. If user-controlled or hybrid systems with telecommunications are used, first-run translation can normally be completed within 24 hours and priority transcriptions within one to two hours. In vendor-operated or hybrid approaches using the postal service, the normal first-run translation turnaround time will be approximately one week.

If a first-run transcript is required, only a single

paper copy (containing approximately twenty-five lines per page and conforming when possible to the final transcript format) should be printed. No CRT text-editing should be performed before the first-run transcript is given to the court reporter, unless the reporter performs it himself.

Reporter Proofreading-Editing

The court reporter should be responsible for completely reviewing the first-run transcript, for making all corrections or modifications on the first-run transcript using standard proofreading notations and symbols, and for resubmitting the corrected transcript within a prescribed time.

Every CAT reporter should be required to follow production norms or standards and help clearly identify delinquent transcripts and reports. The following norms are recommended:

Any court reporter should be able to review at least fifty to seventy-five pages of a first-run transcript each day (equivalent to approximately one to two hours of work). A first-run transcript under 300 pages should be corrected and resubmitted within one week. Finally, a first-run transcript exceeding 300 pages should be reviewed and resubmitted within two weeks.

CRT Text-Editing

CRT text-editing will be most efficiently operated if an entire case is assigned to only one CRT text-editor operator and CAT transcripts are randomly assigned to CRT text-operators if more than one operator is employed. An operator should *not* be permanently assigned to specific court reporters. CRT text-operators must receive comprehensive training by the CAT vendor. Other elements for maximum efficiency are editing of transcripts on a first-in first-out basis so that priority of the text-editing and final transcript production is based on the date of first-run transcript resubmission by the reporter, and paying CRT text-editors an hourly rate instead of a piece rate.

Depending upon the corrections to the first-run translation, the time required to CRT text-edit a standard page (twenty-five lines per page, containing 200 to 225 words) will range from one to three minutes. Precise standards should not be developed. A properly trained text-operator on a good text-editing system should consistently achieve or surpass the following production standards: (1) a correction rate of four to five corrections per minute, (2) a minimal editing rate of twenty-five pages per hour, (3) a normal editing speed of thirty to fifty pages per hour (this assumes the reporters have at least a 95 percent accuracy on their first-run transcript), and (4) six to six and one-half hours of productive text-editing time per day.

Final Production Standards

Once text-editing is completed, several additional steps must be completed before the final transcript can be printed. Standards which should be established to ensure the timely production of the final CAT transcript include those for transcript format, pagination, title page, index page, number of copies normally produced, and retention time.

The standard for transcript format should include specifications for paper size, type size, lines per page, margins (top, left, and right), use of upper and lower case letters, and colloquium format (indentation for Q. and A.), etc. Standards for pagination would specify the number location on the page (top, bottom, right or left side) and sequence (choice of continuous numbering or repeat numbering—on a multiple-day proceeding, each day's proceedings begins with page 1).

The title page would follow a standard format so that only case information need be inserted on the front page. The job sheet submitted at the beginning of the CAT process should provide the necessary information for the text editor to complete the title page. Page references for the index page can be given when the court reporter resubmits the first-run transcript for the final processing.

A standard number of copies to be produced should be decided upon, and the procedures for ordering additional copies should be established. Finally, the final transcript should be retained in the computer system for a specified time. Normally a final transcript should be kept in the computer no longer than two weeks. If additional copies are needed thereafter, they can be produced by photocopying.

Many printers are available to provide a final transcript of acceptable quality at a reasonable production cost. Printers with a minimum capacity of 180 characters per second (six to eight pages per minute) should sufficiently meet final CAT printing needs. In addition, a burster and decollator are practical labor saving devices in jurisdictions with high transcript volume.

Fees

The per-page cost for CAT will depend on the vendor, the service approach, the text-editing approach, and the number of final transcripts required.

Therefore, the precise cost and charge for a CAT-produced page must be determined locally. However, several fee policies should be established regardless of the exact amount. In a court-operated system, the reporter should pay on the basis of the length of the final transcript and receive a standard number of copies. An additional charge should be assessed for each additional copy requested. The reporter might also be assessed additional charges for the preparation of the title page and index page, and for transcript binding.[3]

Evaluation

A comprehensive evaluation of CAT should include a comparison of CAT with traditional transcription methods. Any CAT evaluation should determine how effective and efficient the system is, how it compares to the traditional transcription methods used locally, how CAT has affected transcript production and delays, and how the particular system meets general CAT standards.

The *Evaluation Guidebook to Computer-Aided Transcription*[4] provides guidelines and evaluative measures to determine the value of any transcription technique. Performance measures which provide an accurate indication of CAT's productivity, delays, and reporter efficiency include time, cost, transcript quality, and court reporter utilization.

Time is measured as "macro" or "micro" production time. Macro production time is the median and mean elapsed time to produce a transcript, and the percentage of transcripts completed within specified time limits (e.g., 30 days, 45 days, 60 days, and 90 days). Micro production time is the elapsed time in minutes per page to produce a final transcript, attributable to various procedures or functions (e.g., translation, reporter proofreading, CRT text-editing, and printing).

Cost is given as the per-page cost (or total cost) to produce final transcripts.[5] Transcript quality is determined by the accuracy of the transcript and the satisfaction of transcript users. Court reporter utilization is measurable by computing the percentage of the reporters who require a replacement because they are unavailable for courtroom duty owing to transcript backlog or daily copy requests. This can also be reflected as an "unavailability" cost.

Traditional transcription procedures fall into three classifications: direct typing, in which the reporter translates his own stenotype notes and types the transcript; dictation, in which the reporter translates his stenotype notes and dictates them for subsequent transcribing by a typist; and note reading, in which the reporter employs another individual to read the reporter's stenotype notes and type the transcript.

Each of these traditional transcription methods should be evaluated by the same criteria as CAT—namely, time, costs, transcript quality, and court reporter utilization. Despite the many years of stenotyping's use in courts, no available standards or guidelines for transcript production have yet been published.[6]

Figure 5.2 assesses the traditional transcription methods. Figure 5.3 presents the production standards which different components of CAT should attain. These figures provide some general measures reflecting production capabilities and standards.

A major limitation in CAT production schedules will be the time taken by the court reporter to proofread the first-run transcript. Allowing the court reporter independently to establish his own proofreading efficiency will, in many circumstances, reduce CAT's efficiency. The speed with which court reporters proofread and make notations on a first-run translation will vary between thirty and sixty pages per hour. However, field observations indicate that, unless resubmission standards are established, some reporters may be delinquent in reviewing and resubmitting their first-run transcript.

For each eight hour workshift, a CRT text-editing operator with an adequate text-editing system can produce between 200 and 300 pages of final text. By adding more cathode ray tubes or extra shifts, the daily production on a CAT system can easily be expanded.

[3] For extensive discussion of transcript fee policies see Michael Greenwood and Douglas Dodge, *Management of Court Reporting Services* (Denver: National Center for State Courts, 1976).

[4] J. Michael Greenwood and Jerry R. Tollar, *Evaluation Guidebook to Computer-Aided Transcription* (Denver: National Center for State Courts, 1975).

[5] See Chapter 2, "Financial Feasibility of Computer-Aided Transcription," which analyzes the various cost elements.

[6] However, a few jurisdictions, such as the Superior Court of the District of Columbia, have established production rates based upon transcript size.

Figure 5.2
Assessment of Traditional Transcription Methods

Item Assessed	*Transcription Method*		
	Direct Typing	*Dictation*	*Notereader*
Reporter involvement	Heavy	Heavy	Light
Transcription rates			
Dictation	—	25-35 pp/hr	—
Typing	8-10 pp/hr	10-15 pp/hr	10-15 pp/hr
Proofreading	—	40-50 pp/hr	40-50 pp/hr
Reporter time efficiency ratio (CAT: Traditional)[a]	1:(4-6)	1:3	1:1
Out-of-pocket labor costs	—0—[b]	$.40-$.60/p	$.60-$.85/p
Court reporters utilizing technique	40-45%	45-50%	1-2%[c]

[a]The amount of time used by the reporter in transcribing and preparing the official record; e.g., the CAT reporter usually requires only one-third as much time to prepare his transcripts as the reporter employing the dictation transcription method.

[b]This is the cost to the court reporter for personnel services to type and/or notetead the reporter's notes on dictation. For direct typing, there is no cost listed since the reporter personally provides these services.

[c]Located in a few metropolitan courts.

Figure 5.3
Production Standards for Computer-Aided Transcription

Step	*Per Page Rate*	*Transcript Processing Time*
First-run translation	5 sec. to 1 min.	Within 24 hours of submission (user-controlled or hybrid systems using communications) 1-10 days (vendor-controlled or hydrid systems using mails)
Court reporter proofreading	1.5-3 min.	1-21 days
CRT text-editing	1-2.5 min.	1-7 days
Transcript printing	5-25 sec.	Within 1 day
Overall transcript production		1-21 days (user-controlled) 1-40 days (vendor-controlled)

6. SPECIAL TOPICS CONCERNING CAT

Control

Court reporters tradtionally have been permitted to control the transcription process, because usually only the reporter could translate his stenotype notes. With CAT, whoever controls and operates the CAT system can control the transcription process.

When the court funds the CAT process, it should consider assuming responsibility and control of the process. Three principal benefits attach to the exercise of control by the court. (1) Court administration can provide coordination and administration of the technical system. (2) Availability of funds for the high financial investment enables the court to more quickly and comprehensively establish a CAT facility. Court control also ensures a proper return on the court's investment of both financial and personnel resources. (3) Court control permits efficient transcript production and allows the court to fulfill its duty to best determine the utilization of court reporters and to expedite production of transcripts. Uniform standards can be established to ensure the greatest efficiency.

Court control of CAT will also alleviate other transcription problems which occur often in the courts, such as storage of untranscribed notes or unavailability of transcripts owing to a reporter's protracted illness, death, or departure from the jurisdiction.

Reporter income from transcripts is the major underlying concern of court reporters regarding court control of CAT.[1] Many reporters associate court control with the potential loss of transcript fees. In reality, implementation of a CAT system has little relationship to any transcript fee policies, and probably modifications of the traditional transcript fee system will yield a system in the best interests of the court, the litigants, and the public.

The traditional methods used to prepare transcripts are labor-intensive. CAT is equipment-intensive. In the past few years, computer technology costs have decreased while productivity has increased. Future CAT costs, which are heavily tied to equipment costs, will decrease even further, whereas the cost of traditional transcription methods will increase. CAT permits stenotype reporters to remain competitive with other record-producing technologies by stabilizing transcript costs. It should be noted that after a reporter's dictionary has been compiled, his duties and workload in transcribing notes are reduced, enabling him to produce a transcript at less cost to himself.

Reporter Compatibility

No two court reporters will record precisely the same stenotype notes for the same court proceeding. Dozens of stenotype styles exist. Each court reporter also creates his personal notations and shortcuts. For some court reporters, memory of the courtroom testimony is used to supplement the stenotype notes and ensure an accurate transcript.

Most court reporters have two concerns about reporter compatibility with CAT. First, reporters wonder whether their notes can be translated by a computer software package. After a short training course, any stenotype reporter can immediately produce computer-aided transcripts. However, a high degree of reporter consistency is necessary to permit CAT to be produced quickly and economically.

Second, many reporters believe that they must dramatically alter their note-taking style in order to use CAT. This is not true. An individual dictionary or profile is created for each reporter. Thus, the translation dictionary is modified to accommodate the individual reporter's note-taking style. However, any reporter who is inconsistent in writing style and who commonly uses ambiguous stenoforms cannot expect his dictionary or profile to offset his inconsistencies. The style of such a reporter will not be compatible with CAT.

Three important criteria can be used to determine the extent of a reporter's compatibility with CAT: clean notes with few misstrokes, unambiguous notes with differentiation between common homophones, and reporter motivation.

[1] See Michael Greenwood and Douglas Dodge, *Management of Court Reporting Services* (Denver: National Center for State Courts, 1976).

Misstrokes—also known as fingering errors or shadowing errors—reduce the efficiency of the first-run translation. The cleaner the notes, the fewer the incorrect or missing translations by the computer software package.

Regardless of his stenotype theory, as long as a reporter uses unambiguous stenoforms to represent the same word or phrase, computer software can accurately translate his notes into English. A valid shorthand note may represent several words (such a stenoform is called a homograph). This occurs particularly for English homophones, such as "there" and "their" or "know" and "no." CAT reporters must modify their writing styles to avoid using ambiguous homographs. As long as the homophones are keyed differently, improper translations will be minimized.

Finally, court reporters must be properly motivated to utilize CAT. Since the computer will translate the reporter's notes, some reporters fear the computer is "watching over their shoulder." Reporters must understand that the computer is a tool working *for* them, not against them.

Precise data are not available regarding the percentage of present court reporters who are compatible with CAT. To determine such a statistic, minimum CAT proficiency standards must be established. Economic considerations, particularly text-editing costs, dictate that a reporter must achieve a 95 percent accuracy on first-run translation to be considered compatible with CAT. We estimate that between 40 percent and 60 percent of reporters have sufficiently consistent styles to meet this standard. In the future, courts may want to establish selection procedures and standards which require stenotype applicants to demonstrate compatibility with CAT, at least at the 95 percent first-run proficiency level. Various schools teaching stenotype are incorporating stenotype theories compatible with CAT. It can be anticipated that graduates from such training programs will easily be adaptable to any CAT system.

Text-Editing Approaches

In every CAT system someone must proofread the first-run translation and someone must edit the text using a cathode ray tube (CRT). To what extent and when should the court reporter be involved in the text-editing process? Presently three different approaches are being used.

When only the reporter is involved, the reporter takes total responsibility for the text-editing process, including the review and CRT text-editing operator. When the reporter and text-editor work together, the court reporter receives a first-run transcript copy and makes appropriate editing notations on this paper copy. The CRT text-editing is then done by a trained CRT text-editing operator. In the third approach, only the vendor is involved, and the vendor performs the text-editing without court reporter involvement. This approach is similar to that of utilizing a professional notereader except that the vendor not only interprets the stenotypist's notes but also operates the CRT.

Two fundamental considerations affect the choice of an approach to text-editing. First, the court reporter is ultimately responsible for certifying the accuracy of the transcript, and must have some control over the final product. This includes an opportunity to review and make changes in the transcript. Few if any court reporters would be willing to relinquish this right, and often, only the reporter can recognize improper stenographic entries.[2]

Second, the reporter's principal responsibility is to record proceedings in the courtroom, not manually or electronically prepare transcripts, and the amount of court reporter time needed for transcription should be kept to a minimum. Few court reporters are—or want to be—highly efficient typists or CRT text-editing operators. CRT text-editing operators are highly efficient typists or operators, and often work at salaries substantially lower than court reporters. A court reporter knows best what should be in the official record; the text-editing operator knows best how to use the CRT text-editing system to produce the record.

Most reporters who have used the vendor as the only means of text-editing were dissatisfied with the number of errors which appeared in the final transcript. On the other hand, reporters who undertook their own CRT text-editing devoted too much time to transcription.

The reporter with a text-editor operator option apparently provides the optimal efficiency. Actual experience showed that this approach promises better utilization of the court reporter, higher CRT text-editing efficiency, and a more reliable and accurate final transcript.

Optical Scan Input of Notes

The stenotype machine remains the key device to record the court reporters' notes. At present, all

[2] Many court reporters who have experimented with a vendor note-reader approach were dissatisfied with the final transcript.

CAT systems require that stenotype notes be electronically recorded on magnetic tape cassettes or cartridges.[3]

Development of an optical character recognition (OCR) device to read the stenotype paper notes was attempted in the late 1960s and early 1970s without success. Such a device would eliminate the need for an electronic recorder on the stenotype machine. It is doubtful, however, that such a device will be practical for reading stenotype notes. It would cost from $50,000 to $75,000 per machine, and would have a market limited to major metropolitan court systems. Modified stenotype devices, in contrast, presently cost from $1,200 to $2,500 per machine.

In addition, reliability of prototype OCR devices for reading stenotype notes was greatly affected by the quality of ink, the quality of stenopaper, and the manner in which stenopaper is folded. On the other hand, modified stenotype devices—especially those using cassettes—are highly reliable, are portable, and have been engineered to satisfy nearly all court reporters.

Transcript Size

CAT should be used principally to produce transcripts over twenty pages in length. For each transcript submitted to a CAT system, various technical and administrative tasks must be performed. These include processing of cassettes, completion of administration forms, and typing special entry data. For efficiency and economy, transcripts under twenty pages in length should normally be prepared by a conventional transcription method which does not require these additional tasks.

Use of First-Run Transcript

CAT systems should produce transcripts which are at least 95 percent accurate after the first-run translation. Some individuals and vendors have suggested that text-editing can be eliminated by marking corrections on the first-run transcript or by manual retyping of necessary portions.

Neither of these suggestions has been accepted because of reporter pride and litigant or court expectations of an accurate and clean final transcript. The cost of manually retyping even portions of transcripts would be high. Few individuals will accept a transcript with five to fifteen marked corrections on each page except in an emergency situation.[4]

Upper Case Transcripts

Although special computer equipment can handle both upper and lower case letters, the additional software and personnel costs to enter capitals during CRT text-editing might be prohibitive. Thus, CAT transcripts are usually in upper case letters.

Some individuals feel that upper case transcripts are unacceptable because they are difficult to read. This is not borne out by experience. Most recipients of CAT transcripts have scarcely noticed the change, and some users have found upper case transcripts easier to read.

Transcript Security

Some users are concerned about transcript dissemination and security, particularly in grand jury or juvenile court proceedings. The CAT translation and text-editing systems can be controlled and operated entirely by the court, as is the case in the Philadelphia CAT system. Courts instituting other CAT service approaches can choose from the various security procedures available.

Projections

Users can anticipate further refinements in CAT equipment and service options, but no major innovations are foreseen for the next several years. Further refinements are envisioned in the areas of: (1) adoption of standalone systems, (2) regional service centers, (3) utilization of local government computer facilities, (4) adoption of text-editing systems, and (5) reduced costs.

Standalone Systems

The standalone CAT system has only recently evolved. It features a minicomputer capable of translating, editing, and printing transcripts. Currently, standalones have limited capability and less processing power than the larger computers used in the classical CAT systems. Therefore, they have smaller dictionaries and achieve slightly lower translation accuracy. However, significant changes in central memory ("core"), auxiliary storage (usually disks), and software development are rapidly and

[3] These stenotype devices still produce a paper record for readbacks in court and as back-up to the cassette.

[4] For example, in a Philadelphia case an assistant district attorney on twelve-hour notice replaced another district attorney during a trial.

greatly expanding minicomputer capabilities. In a few years, the standalone systems may have the same production capacity as today's classical CAT system.

Regional Service Centers

Another major development will be the establishment of regional service centers. This will be attractive to state court systems with few major metropolitan centers, widely dispersed courts, or counties with low populations. The regional service center may be established in major metropolitan cities either by a vendor or by the court for a state-wide or regional (multi-county) use.

Court Computer Facilities

Courts which have available a medium or large-scale computer facility should consider installing and controlling the entire CAT system, leasing the first-run translation software as was done for the Philadelphia CAT system.[5] However, those courts which have experimented with their own text-editing subsystem (such as an IBM 370 system using a general purpose IBM software package—ATMS—or a Datapoint text-editing system) have not achieved minimum text-editing production standards.[6] Successful CAT text-editing systems invariably have been minicomputer text-editing subsystems developed by the CAT vendor and not by a hardware manufacturer.

Word Processing

Several word processing manufacturers have begun to investigate CAT. Since CAT is a sophisticated method for word processing, these text-editing systems might be adaptable to CAT. However, these systems must be refined and improved to sufficiently provide CAT text-editing. Several word processing systems already on the market can serve as a provisional CAT text-editing system, although they have limited production capabilities and are not, at this time, cost justifiable.

Costs

A crucial concern to both courts and court reporters is the cost of CAT transcripts. Such costs are based on a per-page estimate. Over the past few years, the cost of CAT has sharply declined. In 1974, the estimated transcription cost varied from $1.50 to $2.25 per page. In 1976, the actual transcription cost in various courts ranged from $.70 to $1.75 per page. Continuing competition among vendors, greater efficiency, and reduced computer systems costs should lead to further reduction in costs for computer-aided transcription.

[5] However, the court must determine whether the vendor's translation software program can be installed and operated on the court's computer.

[6] See Appendix B, discussion of Baton Rouge and Tucson CAT projects.

Appendix A
Vendor Services

Appendix A describes four manufacturers offering computer-aided transcription services. To date, these four companies are the *only* organizations that can provide CAT services which meet the minimal capabilities and production standards prescribed in this report. There are major differences in service and production capabilities among these vendors.

This assessment is based on information and evaluation research available as of January 15, 1977. In any new area of technology such as computer-aided transcription, manufacturer services and equipment may change rapidly. Users should, therefore, carefully assess any proposed vendor service and hardware system and try to keep abreast of new developments.

Vendor: Baron Data Systems
P.O. Box 1317
Oakland, California 94604
(415) 533-2900

Type(s) of CAT Services:	Type(s) of CAT Systems:
User-controlled	Stand-alone

Modified Stenotype Devices

The Baron Data Recorder™ is a patented data recorder and uses a standard cassette. A built-in micro processor compacts the data, so that six hours of notes fill one cassette. The unit incorporates audible and visible warning signals for operating assurance. The unit operates from either standard outlets or long-life, rechargeable nickel cadmium batteries. Unit price: about $2,500 (purchase), $130/mo. (2 yr. lease), $96/mo. (3 yr. lease); longer lease plans cost less.

Reporter Dictionary and Lexicographic Support

Reporter Selection: No testing or evaluation program yet developed.

Dictionary or Profile Compilation: Reporter forms the only dictionary of the system. A list of over 10,000 common words is provided at the start. The reporter enters his own steno outlines. Each reporter has his own dictionary, adding to it with the editing of each transcript. It requires a few days to build the initial reporter dictionary and approximately 1,000 pages of edited transcript to attain adequate translation proficiency.

Lexicographic Support: As a part of the text-editing procedure, a software program is available to retain all steno outline conflicts or errors which the reporter needs to resolve. After completing his transcript the reporter reviews this list and adds to reporter's main dictionary when necessary.

Price per Reporter: Included as part of the transcriber cost and system fees.

Reporter Orientation

Eight weeks prior to installation, dictionaries are built and conflict lists provided. Two weeks prior to installation, orientation is provided either in Oakland or at one of the district offices. After installation, training is provided on-site by vendor personnel.

First-Run Translation

Translation is performed on the user's stand-alone CAT system. Translation is usually unattended and may be performed at night. This is so because no other activities (but printing) can be performed during translation. First-run transcript should be 95 percent accurate after a sufficient dictionary has been compiled. Price: $2,145/mo. or $.65 per page with 3,300 page minimum.

Text-Editing

Current text-editing speeds are marginally adequate; however, further refinements are needed. It is questionable whether court reporters should personally perform CRT text-editing. Price: Equipment rental and service are included in the $2,145/mo. Supplies and personnel costs are not included.

Final Transcript Production

Final transcripts are printed on the stand-alone

systems printer. Different page formats are available. Title pages and indices must be created, and the final transcript must be bound.

Translation Centers

Location	*Type and Status*
Oakland, California	Vendor's demonstration and development models
Modesto, California	User-controlled—starting operations
Dallas, Texas	User-controlled—starting operations

Comments: In the National Center's opinion, translation speed and accuracy are adequate, but CRT text-editing capabilities were minimally acceptable for full-scale operations.

Text-Editing Service Centers

Not applicable for stand-alone CAT systems.

Vendor: Stenocomp, Inc.
7700 Leesburg Pike
Falls Church, Virginia 22043
(703) 893-4878

Type(s) of CAT Services:
Vendor-controlled
User-controlled
Hybrid, with vendor text-editing system

Type(s) of CAT Systems:
Classical, with vendor facilities
Classical, with user facilities

Modified Stenotype Devices

The Stenocomp transcriber records on standard cassettes. The basic unit is portable and can be operated from standard outlets or from rechargeable batteries. A visual indicator warns of equipment malfunction. Formerly, cartridge media were used and found to be expensive, bulky, and unreliable. Stenocomp has dropped the cartridge line. Unit price: about $1,750 (purchase), $50 to $70 per month (lease).

Reporter Dictionary and Lexicographic Support

Reporter Selection: Computer-compatible reporters are selected by Stenocomp. Their compatibility is diagnosed from samples of the reporter's notes.

Dictionary or Profile Compilation: Stenocomp compiles an individualized dictionary from each reporter's notes (initially) and transcripts (ongoing basis). The moderate-sized individual dictionary is periodically updated as warranted. Stenocomp is presently developing a profile questionnaire and a standard dictation section.

Lexicographic Support: Lexicographic support is provided to each reporter on a group and individual basis.

Price per Reporter: Negotiable.

Reporter Orientation

Reporter orientation is conducted at the text-editing facilities, whether vendor's or user's. It is conducted as a component of lexicographic support and system installation.

First-Run Translation

Cassettes and job sheets must be submitted to a Stenocomp text-editing subsystem for translation. The entire job is transmitted to an authorized translation center by telephone communication lines or on magnetic tape. Stenocomp will authorize (license) its translation software to reliable, large users or metropolitan reporting groups. After translation, the first-run transcript is transmitted electronically back to the text-editing subsystem for printing. Price: $.20 to $.35 per page. Negotiable (by licensees).

Text-Editing

After the reporter proofreads/edits his first-run transcript, he returns it to the text-editing center for CRT text-editing by its staff. Price: $50,000 to $100,000 (system purchase depending upon size of configuration). Metropolitan CAT licensees will determine local per-page prices.

Final Transcript Production

Final transcripts are printed on the subsystems printer. Numerous page formats can be used. Title pages and indices must be created and the final transcripts must be bound.

Translation Centers

Location	*Type and Status*
Falls Church, Virginia	Vendor's central facility. Its users, including vendor, access this time-sharing center by communications linkages. Used largely as back-up to other systems.
Philadelphia, Pennsylvania	User-controlled. Stenocomp has installed its translation software on the court's IBM 370/145. Court

	has renewed the project for another year.
Arlington, Virginia	Metropolitan licensees starting operations.
New York City	

Text-Editing Service Centers

Location	*Type and Status*
Falls Church, Virginia	Vendor's central facility.
Philadelphia, Pennsylvania	User-controlled. Has successfully operated for over a year.

Vendor: Stenographic Computer Systems
Division of Stenograph Machines, Inc.
7300 Niles Center Road
Skokie, Illinois 60676
(312) 782-2031

Type(s) of CAT Services:
- Vendor-controlled
- Hybrid, with vendor text-editing system
- Hybrid, without vendor text-editing system

Type(s) of CAT Systems:
- Classical, with vendor text-editing facilities
- Classical, with user text-editing facilities

Modified Stenotype Devices

A basic Stenograph® device which also records the notes upon a standard cassette. The machine is portable and operates from either a standard or four "D" batteries. Unit price: $1,000 (purchase), $50/mo. (lease).

Reporter Dictionary and Lexicographic Support

Reporter Selection: Reporters are counseled if they are noncompatible, but they are not necessarily discouraged from trying the system.

Dictionary or Profile Compilation: Performed from an initial reporter "profile" questionnaire completed by the reporter and from vendor's analysis of a minimum of six cassettes. This twenty-page questionnaire includes a checklist to indicate a reporter's stenotype writing principles for vowels, diphthongs, prefixes, suffixes, and punctuation. In addition, a reporter writes his stenoform outlines for commonly used words or possible stenoform conflicts.

Lexicographic Support: A reporter who travels to Skokie will receive personal attention. Occasionally, the vendor travels to the reporter's site.

Price per Reporter: Profile questionnaire, $25. Dictionary compilation and lexicographic support, $100 one-time charge.

Reporter Orientation

When the text-editing subsystem is installed, Stenograph Machines provides three days of training.

First-Run Translation

To protect the translation software, all first-run translations are performed at Stenographic Machine's computer facility in Chicago. Three options are available: (1) a user with a Stenographic Machines text-editing subsystem can transmit his notes and job sheet to the central computer in Chicago via a telephone connection. The first-run translation is also transmitted back to the subsystem for printing. The user can either pay for his own long-distance calls or pay an additional $.05 per page to use an incoming WATS line; (2) a user with the vendor's subsystem may mail flexible disks to and from Chicago; and (3) a user without the subsystem mails his cassettes to the computer center and later receives his printed first-run transcript by mail. (This is not preferred by the vendor.) Price: $.40 per page (add phone charges), $.45 for incoming WATS calls; $.45 per page for mailing (add mail costs).

Text-Editing

After the reporter proofreads-edits his first-run transcript, it is conveyed to a text-editing subsystem. For users of a Stenograph Machines system, the National Center strongly discourages text-editing subsystems other than those developed by Stenographic Machines. Users with Stenographic Machines text-editing subsystems should use theirs. Price: $30,000 (one CRT tube) or $50,000 (four tubes) purchase price, plus supplies and personnel costs. Pricing for the Chicago text-editing service has not yet been specified.

Final Transcript Production

Final transcripts are printed on the printer of the text-editing subsystem. Transcripts can be printed singly or in multiples up to six, depending on the paper thickness. Many different page formats are possible. Title pages and indices must be created, and the final transcript must be bound.

Translation Centers

Location	*Type and Status*
Chicago, Illinois	Vendor's computer facility. All users, including vendor, access the time-sharing computer center by telephone.

Text-Editing Service Centers

Location	*Type and Status*
Dearborn, Michigan	User-controlled. One reporter operates and owns this vendor-provided subsystem in his home and employees telephone communications to the translation center. The project is only a few months old. The reporter is an official court reporter of the Detroit Recorder's Court: Criminal Division.
Chicago, Illinois	Vendor's central facility. Local users without subsystems use this facility for input. The unit is mainly for development work and is not yet ready for full-scale operations.
Tucson, Arizona (Pima County Superior Court)	User-controlled. No vendor-provided subsystem was available. Three users employ an IBM 2740 terminal with the ATMS software package for CRT text-editing. Its capabilities and speed are very poor.
Baton Rouge, Louisiana (19th Judicial District Court)	User-controlled. No vendor subsystem was available. Instead the court employs a minicomputer for CRT text-editing. The project is at a standstill because of slow text-editing capabilities.

Vendor: Stentran Systems[1]
380 Maple Avenue West
Vienna, Virginia 22180
(703) 281-1760

[1] Stentran Systems is in the business of contractual reporting. Services, stenotype devices, dictionary and lexicographic support, orientation, first-run translation, text-editing, and final transcript production are available only to Stentran's staff.

Type(s) of CAT Services: Vendor-controlled

Type(s) of CAT Systems: Classical, with vendor text-editing facilities

Modified Stenotype Devices

Stentran's transcriber records on standard cassettes. The basic unit is portable and can operate from a rechargeable battery pack or from a standard outlet. Unit price: $2,500 (purchase, one-year warranty for parts and labor); $100 per month (rental and maintenance).

Reporter Dictionary and Lexicographic Support

Reporter Selection: Before selection, a reporter (1) fills out a standard forty to fifty page questionnaire about his style and (2) stenotypes a standard recording (three to four hours) which has been prepared by Stentran. These steps clearly diagnose the reporter's compatibility with Stentran's CAT system and comprise the bulk of Stentran's needs for dictionary and profile compilation.

Dictionary or Profile Compilation: Largely completed during the previous steps. Subsequent additions are made as needed.

Lexicographic Support: Provided as necessary. The vendor has established a three-phase process. In Phase I, the reporter reviews and marks all first-run transcripts. In the second phase, the vendor proofreads and edits first-run translations, but the reporter reviews and submits additional changes to the vendor. Phase III continues until only minor word changes and punctuation changes are noted by the reporter. Phase III consists of total vendor-controlled editing by notereaders; the reporter merely certifies the final transcript.

Price per Reporter: $250 per reporter for initial training and dictionary.

Reporter Orientation

Reporter orientation is normally provided at the vendor's site.

First-Run Translation

Cassettes and job sheets are submitted to Stentran's central site. Outside of the local metropolitan area (Washington, D.C.), cassettes may be mailed or telecommunicated to the central site. After translation, Stentran performs text-editing in Virginia facility. Price: $2.15 to $3.50 per page—contractual reporting services which include both reporting and transcript production.

Text-Editing

The first-run transcript is text-edited by CRT text-editing staff trained in notereading. Price: Included in basic fee.

Final Transcript Production

Final transcripts are printed at Stentran's central site. Numerous formats are available. Title pages and indices must be created, and the final transcript must be bound.

Translation Center

Location	*Type and Status*
Vienna, Virginia	Vendor's central facility. All users must send or telecommunicate their cassettes to this facility.

Comments: Two major projects with courts (Federal District Courts and Cincinnati) did not achieve expected production capabilities. Both projects have been discontinued. Stentran now restricts its services only to contractual reporting. It has received a major reporting contract for computer-readable transcripts with the Federal Trade Commission. Stentran has published a series of textbooks for definitive (computer compatible) stenotype writing.

Text-Editing Service Centers

Location	*Type and Status*
Vienna, Virginia	All text-editing is done at vendor's central facility.

Appendix B
Project Overviews

Project Location

Baton Rouge District Court

Project Manager Contact:

Elwood Sartain
19th Judicial District
East Baton Rouge Parish
Baton Rouge, La. 70802

Basic Information—Project Data

Project Objectives: Objectives included timely filing of transcripts and elimination of transcripts extension requests (approximately two-thirds of transcripts required extensions beyond sixty-day time limit for transcript preparation).
Number of reporters: 1–4.
Grant starting date: May 1975.
Project duration: 3 years.
System approach: Hybrid (without a CAT vendor-provided text-editing subsystem).
Current status: Redesigning system in late 1976 and early 1977. First-run translation was satisfactory. Text-editing system was unsatisfactory; it does not meet transcript requirements of this court.
Funding: Approximately $40,000 (LEAA state block grant) for 1975; approximately $40,000 (LEAA discretionary grant) for 1976.

Program Design

Needs analysis: Transcript preparation was very slow. Most reporters are manual shorthand reporters with poor reporting and inadequate transcript production skills.
Selection of CAT approach: The project started with one qualified reporter. Transcript editing is to be completed on court premises.
Vendor selection process: Competitive bidding.
Vendor Selected: Stenographics Machines, Inc. (provides only first-run translation). Datapoint Corp. (text-editing computer).
Reporter Selection Process: One reporter was initially trained by Stenographic Machines, Inc. When new stenotype reporters are considered for employment by the court, the vendor evaluates reporter's compatibility with CAT on a scale of 1 to 10. Reporters receiving a 7 to 10 rating are hired.
Fees: Official court reporters do not receive any transcript fees. All transcript income belongs to the court.

System Start-Up

Delivery date of stenotype devices: May 1975.
Reporter orientation description: One reporter was fully trained by vendor. New reporters are evaluated by vendor before employment. The first reporter provides in-house training to all new reporters.
Dictionary compilation and lexicographic support description: Vendor updates reporter's dictionaries approximately once a week.
Equipment installation date: October 1975: Datapoint 2200 (rejected October 1976).
Equipment acceptance date: Equipment never met minimal production standards. The court was required to use the system because of contractual agreement. There were inadequate maintenance and software programs, and the court is presently developing a new software program for text-editing. This program is to be installed on the county's NCR computer.

Production Controls and Procedures

Job submission policies: Two techniques are used in the courtroom: (1) multi-track audio recorder machines are used in some courtrooms to record courtroom testimony; or (2) in other courtrooms, manual shorthand reporter takes stenonotes and then dictates notes onto an audio recording machine. The CAT reporter listens to courtroom recording or reporter's dictations and prepares stenotype notes on cassette. The cassette is mailed to vendor in Chicago.

First-run translation: Stenographic Machines Inc. performs first-run translation at its Chicago facility. The vendor mails to the court a computer tape containing the first-run translation. The first-run transcript is printed on the county computer and also stored in text-editing computer. First-run translation charge is $.45 per page.

Reporter proofread-editing: Court reporter proofreads first-run transcript.

CRT text-editing: The initial 500 to 750 pages are text-edited by the court reporter. Otherwise, a text-editor operator completes text-editing and final printing. Datapoint System can produce only ten pages per hour (the court anticipates at least fifteen to twenty pages per hour with new software program).

Final production (printing): Datapoint produces a maximum of forty-five pages per hour. Printing speed is slower if other text-editing operations are used concurrently.

Project Evaluation

Production time: The average transcript takes thirty days. No statistics have been formally tabulated. First-run translation service using the mails averages fifteen days.

Production costs: Not fully estimated; presently, costs are at least $3.00 per page.

Production volume: 15,000 pages (thirty-one lines per page) over the initial twenty-four months of the project.

Transcript quality: Final transcripts are high quality and use upper and lower case.

Comments: While the first-run translation accuracy is good, the text-editing capability provided by Datapoint does *not* meet minimal production standards.

Project Location:

Cincinnati Court of Common Pleas

Project Manager Contact:

Normal Zoller
Court Administrator
Court of Common Pleas
County of Hamilton
Cincinnati, Ohio 45202

Basic Information—Project Data

Project objectives: Objectives were to test the feasibility and applicability of CAT and to evaluate the use of CAT as to its effectiveness and potential.

Number of reporters: 4.

Grant starting date: August, 1975.

Project duration: 14 months.

System approach: Vendor-controlled approach.

Funding: $19,200—Funding through LEAA state block grant.

Current status: The project was discontinued (dissatisfaction with vendor-operated services—not performing to court's expectations—and difficulties with noncompatibility of reporter's writing style).

Program Design

Needs analysis: The court discovered a sizable transcript backlog, with transcripts unavailable for a period of from 10 to 12 weeks. The annual transcript volume was estimated at 70,000 original pages per year.

Selection of CAT approach: project was to be experimental over a six to twelve month period. Four reporters, each transcribing 1,000 pages per month, were envisioned for the experiment. The court preferred to use a vendor-operated approach.

Vendor selection process: Competitive bidding.

Vendor selected: Stentran, Inc.

Date of contract award: June 1975.

Reporter selection process: Four reporters volunteered to participate. The vendor rated all reporters as acceptable for CAT.

Fees: The reporters did not pay for CAT services. The vendor charged the court $.90 per page for translation, text, editing, and printing services. Additional expenditures which were not included in this fee include mailing costs, CRT-installation in June 1976, reporter training, and modified stenotype machines.

System Start-up

Delivery date of stenotype devices: August 1975.

Reporter dictionary compilation and lexicographic support description: Reporters traveled to the vendor's training program in Vienna, Virginia. Three of the four reporters had difficulty adjusting their writing styles.

Equipment installation date: June 1976

Equipment acceptance: Owing to delay in mailing and vendor production of the transcripts during the initial ten months, a CRT was installed in Cincinnati for text-editing. However, the CRT required a long-distance telecommunications hookup with the vendor computer in Virginia to undertake any text-editing.

Production Controls and Procedures

Job submission policies: The reporter mailed his cassettes and job sheet to the vendor.

First-run translation: The first-run transcript was translated and stored at vendor's computer facility in Virginia.

Reporter proofread-editing: For the first ten months of the project, the reporter did not proofread transcript. Instead, the vendor employed note-readers for review. During that final CRT text-editing: See above.

Final production (printing): An original plus one carbon are produced at the vendor's facility in Virginia and mailed to Cincinnati.

Project Evaluation

Evaluator: Court

Final report date: November 15, 1976

Production time: The vendor was unable to produce final transcripts in a timely manner (50 percent unscheduled down time occurred on vendor computer). Transcript production time (submission of tapes until final transcript delivery) was twenty-five to thirty days.

Production costs: No data were collected.

Production volume: Approximately 150 cases totalling 7,000 to 8,000 transcript pages.

Transcript quality: Usually excellent.

Project Location:

Dallas District Court

Project Manager Contact:

Judge James B. Zimmerman
Criminal District Court 3
County Courthouse
Dallas, Texas 75202

Basic Information—Project Data

Project objectives: Objectives were to reduce transcript backlog on appellate cases, test a standalone CAT system, and improve transcript production capability in order to produce all transcript within sixty days (twenty days for transcripts under 300 pages; forty days for transcripts 300 to 750 pages in length).

Number of reporters: 2.

Grant starting date: March 1, 1976.

Project duration: 1 year.

System approach: User-controlled standalone system.

Current status: Operational, with serious and continuous computer malfunctions and poor maintenance.

Funding: $73,672—Funding through LEAA state block grant.

Program Design

Needs analysis: The average appellate court has transcript backlog of fifty-one transcripts. While the statutory time limit for transcripts is ninety days, transcript production time (request for transcript to transcript submission) averages 197 days.

Selection of CAT approach: The demonstration project was initially for two reporters only. Additionally, there was a strong interest in testing standalone approach.

Vendor selection process: Sole source.

Vendor selected: Baron Data Systems.

Date of contract award: Fall, 1976.

Reporter selection process: Acceptance of volunteers.

Fees: The reporters pay court a $.50 per page fee to partially offset first-run translation costs.

System Start-up

Delivery date of stenotype devices: December 1976.

Reporter dictionary compilation and lexicographic support description: Both reporters traveled to the vendor's facility in California for initial training and dictionary compilation. The vendor does *not* provide a dictionary. Instead, the vendor provides 10,000 words for the reporter to review and record in his personal stenoform transliterations. Reporters need to add many additional entries in order to achieve a reasonable first-run translation accuracy.

Equipment installation date: September 1976.

Production Controls and Procedures

Job submission policies: The reporters operate the standalone system. Both reporters cannot work on the computer simultaneously.

First-run translation: Owing to computer failures, first-run translation is only performed during working hours (instead of during the night as recommended by the vendor).

Reporter proofread-editing: See below.

CRT text-editing: Each court reporter does his own CRT text-editing without a prior proofread-edit. One reporter is pleased with her CRT text-editing speed; the other is not, due in part to a less accurate first-run translation.

Final production (printing): Original and carbons produced by minicomputer's printer (fifty to seventy-five lines per minute).

Project Evaluation

Evaluator: Court

Production time: During the initial 100 days of operations, there have been serious machine malfunctions deterring proper system use. Therefore, no data are yet available.

Production costs: No data are available or collected.

Production volume: To date, only one 200-page transcript has been produced.

Transcript quality: when the system is operational, the transcripts are very good.

Comments: Constant machine failures and malfunctions have not permitted evaluation. Maintenance service has been inadequate.

Project Location:

Detroit, Michigan

Project Manager Contact:

Joseph Gondol
Recorder's Court
Detroit, Michigan
(owned and operated by an official court reporter working in Detroit Recorder's Court, Criminal Division)

Basic Information—Project Data

Project objectives: Objectives included relief of manual transcription burden; reduction in court reporters after-hours work on transcript preparation; and increase in transcript productivity.

Number of reporters: 1 (user does additional contract work for a freelance reporter).

Grant starting date: December 1975.

Project duration: Continuing.

System approach: From December 1975 to March 1976, hybrid (mail service for first-run translation); from March 1976 to the present, hybrid (telecommunication for first-run translation).

Current status: Operational.

Funding: Private investment (purchase): approximately $25,000 for minicomputer text-editing system.

Program Design

Needs analysis: This system was selected by the reporter because of his personal interest. Before implementing CAT, the court reporter's annual transcript production was approximately 7,000 pages.

Selection of CAT approach: N/A.

Vendor selection process: Sole source.

Vendor selected: Stenographic Machines, Inc.

Date of contract award: December 1975.

Reporter selection process: None (reporter's choice).

Fees: Court reporter pays for total CAT system.

System Start-Up

Delivery date of stenotype devices: May 1974.

Reporter dictionary compilation and lexicographic support description: The reporter filled out the vendor's standardized questionnaire, submitted data cassettes, and had discussions with the vendor. The vendor was extremely cooperative and supportive. Stenographic Machines, Inc. has been updating his profile and subdictionary at no additional charge. The reporter has slightly modified his writing style.

Equipment installation date: December 1975.

Equipment acceptance date: December 1975.

Production Controls and Procedures

Job submission policies: Completes "job sheet" for each case.

First-run translation: The court reporter establishes his own priorities. After minicomputer preprocessing, he uses long-distance telephone communications to submit his job and to recall the first-run transcript from the vendor site in Chicago, Illinois. Normally first-run translation is completed between 8:00 p.m. and 8:00 a.m. CST. Estimated first-run accuracy is 97 to 98 percent.

Reporter proofread-editing: None. The reporter performs his text-editing at the CRT.

CRT text-editing: Performed by the court reporter himself.

Final production (printing): Final transcripts are produced on the minicomputer printer at 300 lines per minute. The reporter prints four originals (no carbons) by rerunning the printer four times.

Project Evaluation

Final report date: N/A.

Production time: No statistics are collected; however, the reporter is able to easily meet all statutory or transcript request deadlines. Statutory transcript submission requirements are ninety days.

Production costs: No statistics are collected; however, the reporter estimates that his present operating costs (excluding minicomputer purchase) are equivalent to those of his traditional method.

Production volume: In 1976, Mr. Gondol produced 15,000 transcript pages for himself plus an additional 3,000 pages for freelance reporter.

Transcript quality: Very good.

Project Location:

Pima County Superior Court
Tucson, Arizona

Project Manager or Contact:

Bruce Johnson
Room 462
Division 9
Pima County Courthouse
Tucson, Arizona 85701

Basic Information—Project Data

Project objectives: Experimental project to test the technical feasibility of CAT.
Number of reporters: 3.
Grant starting date: 1973.
Project duration: 3 years and continuing.
System approach: Hybrid (without a vendor-provided text-editing subsystem).
Current status: Operational (However, low transcript volume and inadequate text-editing capability).
Funding: Funding thru LEAA state block grant, 1973–1974, $10,000; 1974–1975, $12,000 to $15,000.

Program Design

Needs analysis: None.
Selection of CAT approach: No particular criteria were applied at the time.
Vendor selection process: Sole source.
Vendor selected: Stenographic Machines, Inc.
Date of contract award: 1974.
Reporter selection process: Four reporters submitted sample stenotyped paper notes for review. The vendor rated three reporters as having acceptable writing styles compatible with CAT.
Fees: The reporters have not paid for CAT services. In July 1976, the court reporters hired a CRT text-editing operator on a piece-rate basis.

System Start-Up

Delivery date of stenotype devices: 1973.
Reporter dictionary compilation and lexicographic support description: The vendor sent a staff member to Tucson for initial dictionary development and training. Additional work has also been performed in Chicago.
Equipment installation date: The vendor could not provide a text-editing system in 1973. Instead, in 1975 the County Data Processing Office leased and modified an IBM text-editing software package (ATMS) for use on the county's IBM 370 computer with IBM 2740 terminals.

Production Controls and Procedures

Job submission policies: Reporters mail their cassettes and job sheets to Chicago, Illinois.
First-run translation: Stenograph Machines performs first-run translation at its Chicago facility. The vendor then sends a standard computer tape containing the first-run translation to Tucson. The County Data Processing Center prints the first-run transcript from the tape and stores the first-run translation in its computer for eventual text-editing.
Reporter proofread-editing: The reporters proofread-edit their own first-run transcripts.
CRT text-editing: Before mid-1976, CRT text-editing was performed by the reporters. As of July 1976, a part-time CRT text-editing operator has been hired. The text-editing package (IBM 2740 terminal and ATMS software) rents for over $500 per month.
Final production (printing): Final transcripts are on the county's equipment. Continuous form paper is used to produce 8½ by 11 inch transcripts.

Project Evaluation

Final report date: N/A.
Production time: No data were formally collected.
Production costs: No data were formally collected. The total per-page costs are over $2.50, thus far.
Production volume: No data were formally available. Volume is estimated to be under 4,000 pages per year. Recently, production has increased to approximately 500 pages per month.
Transcript quality: Good to very good.
Comments: This project was one of the earliest attempts by a court to implement CAT. While the first-run translation accuracy is good, the text-editing capability provided by the IBM 2740 terminal with ATMS software clearly does *not* meet minimal production standards.

Project Location:

U.S. Federal District Courts: approximately 20 locations

Project Manager:

Tony Engel
Federal Judicial Center
1520 H Street, N.W.
Washington, D.C.

Basic Information—Project Data

Project objectives: Objectives were (1) to determine

the percentage of today's stenotype reporters who are compatible with CAT; (2) to assess the impact of CAT upon transcript delay; (3) to ascertain the percentage of reporters and the types of transcripts for which CAT is economically advantageous; (4) to determine what steps, if any, can be taken to reduce CAT costs or to adjust the transcript fee structure when CAT's present costs are an impediment to CAT's use; and (5) to determine what service approaches produce acceptable transcripts.

Number of reporters: 43

Grant starting date: January 1975

Project duration: 2 years

Funding: Approximately $150,000

Needs analysis: None

Selection of CAT approach: (1) FJC decided that it would not purchase additional computer equipment; (2) FJC wished to establish a full operating system; (3) FJC insisted upon rental of stenotype devices (only Stentran Systems Inc. could meet these criteria).

Vendor selection process: Sole source.

Vendor selected: Stentran Systems, Inc.

Date of contract award: January 1975 (initial), additional contracts.

Comments: The Federal Judicial Center will publish a report on the evaluation of computer-aided transcription in the Federal District Courts. Those interested in a comprehensive review of their findings and conclusions should contact Systems and Technology Division, Federal Judicial Center, 1525 H Street, N.W., Washington, D.C.

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North Dakota
William L. Paulson
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Ohio
C. William O'Neill
Chief Justice, Supreme Court

Oklahoma
B. Don Barnes
Justice, Supreme Court

Oregon
Loren D. Hicks
State Court Administrator

Pennsylvania
Samuel J. Roberts
Justice, Supreme Court

Rhode Island
Walter J. Kane
Court Administrator

South Carolina
J. Woodrow Lewis
Chief Justice, Supreme Court

South Dakota
Roger L. Wollman
Justice, Supreme Court

Tennessee
Paul R. Summers
Chancellor, Supreme Court

Texas
Thomas M. Reavley
Justice, Supreme Court

Utah
Thornley K. Swan
Judge, Second Judicial Circuit

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Chief Justice, Supreme Court

Virgin Islands
Cyril Michael
Presiding Judge, Municipal Court

APPENDIX C
SAMPLE REQUEST FOR PROPOSALS

National Center for State Courts

Suite 200, Lincoln Center Building
1660 Lincoln Street
Denver, Colorado 80203
(303) 892-1261

SUBJECT: Request for Proposal entitled "Philadelphia Court-Operated Computer-Aided Transcription Service Center"

Closing Date: Receipt of Proposals not later than 5:00 P.M., MST, December 20, 1974, at the National Center for State Courts, 1660 Lincoln Street, Suite 200, Denver, Colorado 80203

Gentlemen:

The National Center for State Courts and the Municipal and Common Pleas Courts of Philadelphia solicit your proposal on the subject requirement.

The Request for Proposal (RFP) consists of this transmittal letter and Attachments A through H. Offerors are to follow the guidelines presented in Attachment A, "Background", and Attachment B, "Solicitation Instructions and Conditions", in preparing and delivering their proposals. Proposals are to include accurate and concise information as required by this RFP.

This project is estimated to be an effort over a period of 18 months.

Offerors are reminded that proposals submitted in elaborate format and expensive binders are considered excessive and are neither necessary nor desired. Proposals must not exceed fifty typed, double-spaced pages and must conform to the format present as Attachment B.

Telegraphic proposals or telegraphic notices of intent to propose are not authorized and will not be accepted.

All inquiries concerning this RFP are to be directed to:

J. Michael Greenwood
National Center for State Courts
1660 Lincoln Street, Suite 200
Denver, Colorado 80203
(303) 892-1261

Sincerely yours,

J. Michael Greenwood
Chief, Systems and Technology

PHILADELPHIA COURT-OPERATED COMPUTER-AIDED TRANSCRIPTION SERVICE CENTER

ATTACHMENT A
BACKGROUND

A. Introduction

In order to evaluate the impact of a court-operated computer-aided transcription (CAT) center in the Common Pleas and Municipal Courts of Philadelphia, the Common Pleas and Municipal Courts of Philadelphia and Systems & Technology Division, National Center for State Courts (hereinafter referred to as the Philadelphia Court and NCSC), are jointly soliciting requests for proposals.

This demonstration project is a segment of a National Institute for Law Enforcement and Criminal Justice grant awarded to the National Center for State Courts to complete a comprehensive evaluation of the impact of computer-aided transcription upon the court's transcription process.

A Court-Operated CAT system is defined as CAT services performed on court-owned or court-controlled equipment and administered by the court. The vendor (offeror) installs his computer programs (software) on the court-controlled system and the court reporters provide stenotype notes (recorded on magnetic tape medium or inputted using optical scan reader) to the court for processing on CAT system. A central processor such as an IBM 360 or 370 is normally required for first-run translation of stenotype notes into English language, and a minicomputer sub-system with CRTs is generally used for editing. Under such a system, the entire system is under court control and operation.

B. Task Objectives

This particular solicitation is for the purpose of establishing a court-operated CAT center in a major metropolitan court system—namely, one which will be under the direct operating control of the Court Administrative Office of the Philadelphia Court.

The Philadelphia Court ideally prefers that the system software be implanted on its currently held equipment (see section C, *Work Statement*). While the Philadelphia Court may accept installation of some additional hardware, the hardware must all be within the physical facilities of the court. Furthermore, normal equipment operations shall be conducted by personnel employed by the court.

It is envisioned that the following responsibilities will be delegated to the selected offeror:

1. Installation of computer-aided transcription to include:
   a) translation software programs and on-going software releases onto the Philadelphia Court's IBM 370/145 DOS computer (see section C, *Work Statement*);
   b) editing software programs and developments;
   c) editing sub-system hardware, *if required* (court prefers use of existing equipment);
   d) delivery and maintenance of modified stenotype machines, if required;
   e) compilation of court reporter individual dictionaries or sub-dictionaries.
2. Maintenance of the software packages and any hardware supplied by the offeror.
3. Training of court personnel including:
   a) Court reporter training on modified stenotype machines, assist court reporters in developing their dictionaries to be machine-compatible, and train court reporters to additional procedures in CAT transcript preparation.
   b) CRT editor training; i.e. training of individuals to make corrections of the first-run transcripts by means of electronic editing system or sub-system.
   c) Editing system (or sub-system) operator training to include job changeover procedures and production operations.

The Philadelphia Court and/or NCSC will be responsible for:

(a) Selection of offeror and contract negotiations.
(b) Approval of offeror's installation of CAT system.
(c) Daily operation of entire CAT system after installation.
(d) Employment (including hiring) of CAT operations personnel; i.e., CRT editors, computer operators.
(e) Data collection.

(f) Preparation of evaluation report.
(g) Payments for offeror's services.

C. Work Statement

The Philadelphia Court will provide the following capabilities over the 12-month operational period of the CAT demonstration:

1. Computer time and support personnel for translation on court's IBM 370/145 DOS-VS computer system with a core capacity of 384K and a five partition environment. The following peripheral equipment is utilized:

2—1403 printers, a 2501 card reader, a 2540 card reader punch, 6—3420 tape drives, and 16—3330 disc storage units.

2. Editing personnel (2 to 4 individuals) and system personnel to operate daily eight-hour shift (if necessary, daily twelve-hour shift) of transcript editing.
3. Court reporters to use CAT service center (initially training and tuning 15 to 20 reporters to CAT system; and ultimately a potential 30 reporters).
4. Space, facilities, and supplies (such as paper and ribbons).

The *offeror* will be required to perform the following tasks:

Task 1	Provide 15 modified stenotype devices compatible with offeror's computer-aided transcription system and which also produce the usual stenotype paper output.
Task 2	Compile court reporters' subdictionaries and train court reporters for compatibility with the offeror's computer-aided transcription system. (Initially work with 15–20 reporters, and potentially 10 additional reporters during latter part of project.)
Task 3	Install offeror's translation software package on the court's IBM 370/145 DOS system.
Task 4	Install editing software and any required additional hardware to produce an annual volume of at least 150,000 pages of transcript.
Task 5	Orient and train court-provided personnel to operate the offeror's editing system package.
Task 6	Provide needed additional support and maintenance service

D. Work Timetable

Due to the Philadelphia Court's desire to start the project as soon as possible, the offeror should gear his proposal to the following *tentative* CAT timetable:

November 15, 1974	RFP Release
December 9, 1974	Bidder's Conference, at option of NCSC and Philadelphia Court
December 20, 1974	5:00 p.m. (MST) Closing date for proposal submissions
January 6–10, 1975	Contract negotiations
January 17, 1975	Contract award
April 18, 1975	System installation
April 30, 1975	System operational; Completion of training of 15–20 court reporters and CAT system personnel

The NCSC and Philadelphia Court realize that the above tentative timetable is stringent; however, NCSC and the Philadelphia Court hope to meet or surpass the timetable and will relax the timetable only under duress.

The most critical segment is the training timetable. Training for the first 15–20 court reporters should conclude when the system has become operational and satisfactory performance in the Philadelphia Court is demonstrated to the Philadelphia Court and NCSC. The tentative requirement that training be concluded when the system becomes operational could mean that the successful offeror must be capable of training personnel *before* the system is operationally installed in the Philadelphia Court. Training of the court reporters should nevertheless take place in Philadelphia. (See Attachment B, Section A1, *Technical Proposal*)

E. Evaluative Goals

The principal objectives of this demonstration project will be to evaluate computer-aided transcription for:

1. Transcript production cost—to assess the economic feasibility; in particular to compare CAT process to traditional stenotype transcription procedures.
2. Transcript production time—to assess the reduction in delay in transcription production of official record of court proceedings.
3. Quality and accuracy of CAT transcripts—to assess accuracy of 1st-run transcripts (without human editing) and to assess accuracy and quality of final CAT transcript; in particular, meeting user standards such as those of judges, lawyers, court reporters.

4. Acceptance of CAT among stenotype court reporters.

5. Court reporter capability with CAT—to assess percentage of stenotype court reporters who will be able to use CAT.

ATTACHMENT B
SOLICITATION INSTRUCTIONS AND CONDITIONS

A. Proposals

Proposals are to be prepared and submitted in two separate sections—"Technical Proposal" and "Pricing Proposal" with necessary certifications, respectively. The Technical section shall contain resumes of professional/technical personnel who will work on the project.

1. Technical proposal. The technical proposal should describe the offeror's technical approach and production procedures to provide a computer-aided transcription service for court reporters in the Philadelphia Court. The technical proposal should be described in detail, but not be limited to: configurational requirements (computer and peripheral equipment); software capabilities; standards and requirements for training court reporters, editors, and systems operator(s) for entire system package; outline of court reporter training, to include program to meet timetable outlined in Attachment A, Section D, *Work Timetable;* and outlines of the tasks prerequisite to successful system installation and operations in the Philadelphia Court. Attachment A, Section C, *Work Statement* contains a description of the services envisioned.

The Technical Proposal should detail the offeror's staff, providing resumes for staff and any proposed consultants. Background information on the company should also be provided. It is understood that the offeror's project leader will manage the work and represent the Contractor in all meetings with the Philadelphia Court and NCSC.

2. Pricing proposal. The pricing proposal submitted should be structured within the following guidelines, which also have an impact on the Technical Proposal:

a) Equipment, materials, etc.;
b) Software costs;
c) Installation, testing, etc.;
d) Training costs;
e) Personnel and consultants;
f) Travel; and
g) Other cost factors considered necessary to successfully complete the program in an efficient and timely manner.

The offeror should outline a pricing structure using approximately 150,000 pages produced on 15 stenotype machines by approximately 30 court reporters over a 12-month period as parameters for cost estimating. The Philadelphia Court transcripts will be approximately 200 words to the page and an original and five copies (probably two runs of three-ply paper) is required.

The Philadelphia Court and NCSC additionally solicit pricing structures for unlimited usage within the 30-reporter framework. Offerors should recognize that proposed fixed monthly rates for unlimited usage may necessitate configurational changes; such equipment changes must be annotated and outlined in the *Technical Proposal* as well as the *Pricing Proposal.*

Attachment C, *Cost Sheet,* is to be used in the Pricing Proposal. Offerors are to attach schedules they feel are necessary to support and/or explain the proposed costs. If the Statement of Work contains a breakdown of the work by phases or tasks, the *Pricing Proposal* is to include an attachment showing a cost breakdown, by cost element, for each phase or task.

To prevent opening by unauthorized individuals, your proposal is to be addressed and identified on the outer wrapper as follows:

National Center for State Courts
1660 Lincoln Street
Suite 200
Denver, Colorado 80203
PROPOSAL ATTN: J. Michael Greenwood
DO NOT OPEN

Ten copies of each proposal are to be submitted. In submitting a proposal, the offerors agree that the proposal remains valid for a period of 90 calendar days after the closing date for submission of proposals and may be extended beyond that time by mutual agreement.

Whenever repetition occurs anywhere in the Request for Proposal with regard to similar request for information, offerors need not repeat the information. However, reference should be made to the exact location in the proposal where the information is already recorded.

B. Acceptance, Negotiation and Award

A contract may be negotiated with the offeror whose proposal is most advantageous, price and other factors considered. Philadelphia Court and NCSC reserve the right, with the approval of the National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration, to accept other than the lowest cost proposal and to reject any or all proposals.

C. Evaluation Criteria

Proposals will be evaluated and the prospective contractor selected principally on the following criteria:

a) Systems compatibility with court reporting practices;
b) First-run transcript capability;
c) Total system capability (i.e. first-run transcription plus editing);
d) Cost factors;
e) Fiscal and managerial stability;
f) Completeness of evaluative data provided by contractor;
g) Compatibility with Philadelphia ADP System.

Vendor must show or have shown performance capability satisfactory to the Systems & Technology Division of NCSC.

To aid in the selection of reporters, vendor should enumerate the qualifications necessary for a reporter to use the offeror's system.

The NCSC and Philadelphia Court project staff will select those bids most suitable for field demonstration and submit a recommendation to a project advisory committee composed of representatives of the National Institute of Law Enforcement and Criminal Justice, the National Center for State Courts, the Federal Judicial Center, the National Shorthand Reporters' Association, and Philadelphia Court of Common Pleas. All major subcontracts (over $2500) let under the project grant will be submitted to the National Institute of LEAA for review prior to execution.

D. Term of Contract

The term of any resultant contract shall not exceed a period of 12 months of CAT operation and shall not exceed sixteen (16) months from the date of execution by the Philadelphia Court and NCSC. Any contract let as a result of this solicitation will contain terms allowing early termination by Philadelphia Court or NCSC. Hardware and software rental payments to the successful offeror shall not accrue until satisfactory performance in the Philadelphia Court is demonstrated to the Philadelphia Court and NCSC.

E. Contract Type

A "fixed-price" type of contract based on a fixed monthly cost is envisioned. Offerors may propose additional type of contracts if they so desire. However, "cost-plus-percentage-of-costs" contracts under which the fee increases when costs increase are prohibited.

F. Certifications and Supplemental Data

1. Since this RFP is a sub-contract of an NI-LEAA grant, offerors are to complete the following LEAA certification and supplemental data forms contained in this RFP:

(i) Form LEAA-ADMIN-33, Supplement to Contract Proposal (Required Certifications) (Attachment D);
(ii) Form LEAA-ADMIN-28, Basic Data Sheet (Attachment E);
(iii) Form LEAA-ADMIN-20, Patent Information Checklist (Attachment F);
(iv) Stabilization of Prices, Wages and Salaries (Attachment G);
(v) Disclosure Statement (Attachment H).

The completed forms are to be submitted as part of the *Pricing Proposal.*

2. Subsequent to negotiations and prior to contract award, the successful offeror is required to execute a Certificate of Current Cost or Pricing Data, in accordance with FPR 1–3.807.4.

Affirmative Action Compliance Program is furnished for your information (Attachment I).

G. Revised and/or Additional Provisions

NCSC or at the NCSC's discretion the Philadelphia Court reserves the right to revise any article or clause of any provision, or to add or delete any article or clause, prior to the award of a contract. In addition, any resultant contract is to include such other provisions as are required by the Federal Procurement Regulations in effect as of the date of such contract and such other provisions as may be mutually agreed upon.

H. Modification of Contract

NCSC, or at the NCSC's discretion the Philadelphia Court, reserves the right to amend, extend, curtail, or otherwise change the terms described in this RFP upon determination that such action is to the advantage of the program effort.

I. Pre-Award Equal Opportunity Actions

Prior to award of this contract, the apparent successful offeror which is considered responsive and responsible, price and other factors considered, shall—if requested by the Contracting Officer or an authorized representative—furnish the Contracting Officer with an acceptable written program for complying with the clause titled "Equal Opportunity." This program is to include a plan for taking affirmative action in accordance with the clause. Prior to contract award, the Contracting Officer may have a compliance review made of that offeror's ability to comply with the "Equal Opportunity" clause.

J. Proprietary Programs

The Philadelphia Court and NCSC have no interest in nor claim any right to specific software programs required to prepare computer-aided transcripts. Such material remains the property of the offeror. The disposition of individualized dictionaries (or sub-dictionaries) which are prepared for the court reporters shall remain in the exclusive domain of the Philadelphia Court.

K. Authority to Bind Offerors

The offeror's proposal is to identify the individual(s) having authority to contractually bind the offeror. It is also to name the person to be contacted both during the period of evaluation of proposals and for prompt contract administration upon award of contract. This information is to include: Name, Title, Address, Telephone Number, and Area Code.

L. Late Proposals and Modifications

Late proposals and modifications thereof received at the office designated in this Request for Proposal after the time and date set for the receipt of proposals are not to be considered unless (i) they are received before award is made, and (ii) *either* they are sent by registered mail *or* by certified mail—for which an official, dated post office stamp (postmark) on the original receipt for certified mail has been obtained, *and* it is determined by NCSC that the late receipt was due solely to mishandling by the Center after receipt at the Center's offices; *PROVIDED* that timely receipt at such installation is established upon examination of the appropriate date or time stamp (if any) of such installation, or of other documentary evidence of such installation or of the post office serving it.

However, a modification which makes the terms of the otherwise successful offer more favorable to the NCSC will be considered at any time it is received prior to the award of a contract.

M. Conditions (LEAA)

The standard grant conditions and special grant conditions imposed on this grant by the National Institute of Law Enforcement and Criminal Justice are attached at Attachment I. These grant conditions will be a part of any contract resulting from this RFP.

N. Length of Proposals

Proposals are *not* to exceed fifty (50) typed, double-spaced pages.

O. Project Director

The Project Coordinators responsible for the technical administration of the project are:

J. MICHAEL GREENWOOD	LARRY POLANSKY
Systems and Technology	Chief Deputy Court Administrator
National Center for State Courts	Office of Courts Administration
1660 Lincoln Street—Suite 200	Common Pleas and Municipal Courts of Philadelphia
Denver, Colorado 80203	Room 370, City Hall Philadelphia, Pennsylvania 19107

All questions regarding this RFP shall be directed to Mike Greenwood of the National Center for State Courts.

ATTACHMENT C
COST SHEET

(See following explanation)

Line Item

1a	Modified stenotype device, unit purchase price *including* 12 months maintenance	_____ each
1b	Modified stenotype device, unit monthly lease price *including* monthly maintenance	_____ each
1c	Price per cartridge/cassette (assuming 25 per lot) A cartridge/cassette will normally contain _____ pages (fill blank) of transcript.	_____ each
2a	Monthly lease cost for translation software on court's IBM 370/145 DOS computer	_____ / mo.
2b	Monthly least cost for editing (input-edit) software (if separable from hardware)	_____ / mo.
2c	Monthly lease cost for editing (input-edit) hardware (if any)	_____ / mo.
3	Monthly maintenance cost for editing (input-edit) hardware (if any)	_____ / mo.
4	Purchase price for editing (input-edit) hardware (if any) *after* 12 months of lease	_____
5	Installation, test and debug costs (explain)	_____
6	Reporter training cost (per reporter—30 planned)	_____ each
7	Additional training cost (e.g., sub-system editors, computer operators)	
8	Additional personnel costs (list person, tasks to be performed, man-days, and cost)	
9	Other costs to vendor (explain)	

Line Item Explanation

Line Item

1a The purchase or lease of 15 modified stenotype devices is contemplated. If you will sell us the devices, quote us a unit purchase price, including 12 months of maintenance.

1b If you will lease the devices, quote a unit monthly lease price, including monthly maintenance.

1c Please quote the price per cartridge/cassette for quantities of at least 25 per lot, and estimate for us the number of pages (assume 200 words per page) which a cartridge/cassette normally will contain.

2a Lease of the translation software is contemplated for a 12-month period. State the monthly lease cost of the translation software for 150,000 pages (a page is 200 words). If your package is costed in another manner, explain the costs.

NOTE: The Philadelphia Court and NCSC additionally solicit pricing structures for 250,000 pages annually and for unlimited usage within the 30-reporter structure. If you will offer either or both, please submit additional, carefully marked Cost Sheets for these offers.

2b If the lease costs of your editing software are separate from the translation software or from the editing hardware (if any), please state the monthly costs. If non-separable, so state.

2c If additional equipment is required to implement your editing system on the Philadelphia computer (described in Attachment A, Section C, *Work Statement*), state the monthly lease price for such editing hardware.

3 State the monthly cost for maintaining the editing (input-edit) subsystem hardware (if required). If you do not offer maintenance or maintenance is included in your monthly lease cost, so state.

4 Philadelphia Court and NCSC intend to lease the editing (input-edit) hardware (if any) for 12 months. In the interest of the Philadelphia Court, it is desirable that some of that money be applied toward the purchase price of the system. If you will (at the option of the court) sell the subsystem to the court after 12 months of lease, state that subsystem purchase price in line item 4.

SAMPLE: If the base purchase price is $50,000 and you are willing to apply 75% of the 12 months lease at $2,000 per month toward the purchase price, the line item 4 purchase price is $50,000 minus 75% of 12 times $2,000

$= \$50{,}000 - .75 \times 12 \times \$2{,}000$

$= \$50{,}000 - \$18{,}000$

$= \$2{,}000$

If you will not consider such a purchase option, so state.

5 If not included elsewhere, state your installation, test, and debug costs. Explain these costs, including shipping, systems documentation, and any other systems support costs you will incur prior to actual operations. Attach extra sheets as necessary.

6 It is contemplated that 30 reporters will be trained to use the computer-aided transcription services during this project. State training costs on a per-reporter basis, if applicable. If you offer reporter training and reporter dictionary formulation on another costing basis, please explain it. Keep in mind the training timetable considerations of Attachment A, Section D, *Work Timetable.* Attach extra sheets as necessary.

7 List the training costs for the editing subsystem operator, editors and any other Philadelphia Court personnel. Attach extra sheets as necessary.

8 Outline any personnel costs you incur but have not included elsewhere. List the person, tasks to be performed, man-days, and costs of such personnel. Attach extra sheets as necessary.

9 List and explain all costs you incur but have not included elsewhere. Attach extra sheets as necessary.

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END