

AN EVALUATION OF DOCUMENT IMAGING IN A
LIMITED JURISDICTION COURT!

AUSTIN MUNICIPAL COURT
AUSTIN, TEXAS
/



INSTITUTE FOR COURT MANAGEMENT
COURT EXECUTIVE DEVELOPMENT PROGRAM
PHASE III PROJECT

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ABSTRACT

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The focus of this paper was based on a simple question. What is the applicability of document imaging system to the Austin Municipal Court? Trying to answer this simple question proved to be an extremely complex process.

The initial goal was to determine what advantages a document imaging system offered the Court and to study the disadvantages. Another goal was to understand the decision making process that other courts had undergone to make their decision to implement.

It was extremely easy to find literature about document imaging. There were numerous sources describing the process and addressing the advantages. It was little more difficult to find information about the disadvantages. It was almost impossible to find any information about the process that lead to the decision to implement document imaging.

As a result of the research process, a possible option of implementation was identified. The implementation of document imaging of citations and complaints in conjunction with the elimination of the paper copy would have a major impact on the operations in the Court. A successful implementation of such a project would improve customer service and help eliminate the problems of missing case files and file security.

Some of the conclusions derived through research were:

1. This is a complex issue, the problems to be solved and optimal results desired, need to be identified and understood at all levels of the organization.
2. This isn't a decision that should be made with a team with a preconceived idea of the only right solution or without the involvement of someone to provide objectivity and distance.

INTRODUCTION

INTRODUCTION

Austin Municipal Court is a limited jurisdiction court serving the capital city and commuters from the surrounding municipalities and townships. Austin's population is 492,329. The metropolitan area increases the base population to over 800,000. Austin is the center of Texas government as well as an education center. It is home to the University of Texas, St Edward's University, Huston-Tillotson College, Concordia Lutheran College and Austin Community College.

The Court has jurisdiction over Class C misdemeanors, traffic and parking offenses. Class C misdemeanors are punishable by fine only with a maximum penalty of \$500 dollars.

All traffic offenses are criminal charges in Texas. This means that all defendants have a right to a jury trial on any charge including an expired drivers license violation or a speeding violation. The Court doesn't have jurisdiction over serious traffic offenses such as a driving under the influence because the punishment includes jail time and exceeds the \$500 dollar maximum fine. Failure to appear in response to a citation will result in an additional charge of violation of promise to appear and an arrest warrant being issued.

Parking offenses were decriminalized in 1992. Parking

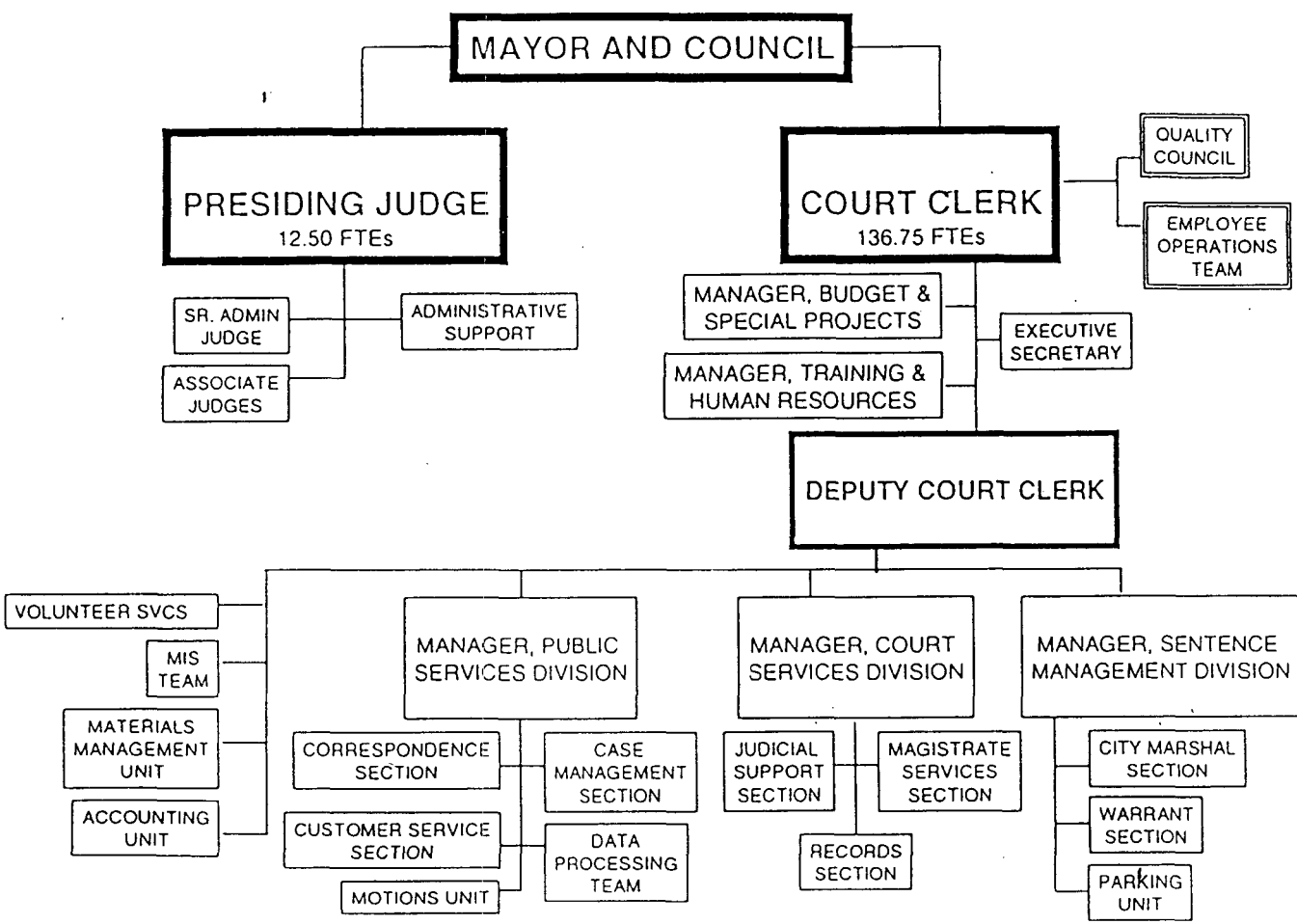
citations are adjudicated by a Hearing officer in the Sentence Management division. Parking appeals are heard by the Judges in the Municipal Court.

In fiscal year 1993-94, 267,221 misdemeanors and traffic charges and 193,672 parking charges were filed. The Court is also responsible for the magistration of higher charges and handles initial appearances conducted after hours. The Court maintains a 24 hour operation in the warrant and customer service units.

In 1993 the Court purchased an AS400 computer and a new software system. The Judicial Enforcement Management System (JEMS) was purchased from the Professional Computer Software Services (PCSS) company. The new software was implemented in July 1994. Currently the Court is running dual systems and plans to discontinue the maintenance of the legacy system in February 1995.

The judicial staff consists of seven full time regular judges, two full time equivalent relief judges, and three full time and one part time clerical support positions. The clerk's office is supported by 136.75 positions.

The records section consists of one supervisor, one team leader, eight full time employees and one part time employee. The



1994-95 MUNICIPAL COURT
ORGANIZATIONAL CHART
1/5/95

fig. 1

record section is responsible for filing and retrieving case files, pulling disposed cases and preparing them for off-site storage at the City records center, implementing a records retention schedule and preparing case files for the dockets. When the scheduling module is implemented in April 1995, the records section will also become responsible for the processing of motions.

The records staff respond to requests for files from all court staff members and the prosecutors office. The staff also respond to requests for information from the public and other government agencies. A large percentage of staff time is devoted to retrieving and filing case files as a result. The primary reason for file retrieval, aside from docket support, is the verification of information.

Currently there is one off-site operation located in the north sub-station of the Austin Police Department. The operation is manned by two clerks using a modem and pc hookup. The clerks off-site perform the same function as their counterparts assigned to the front counter at the Court.

In the next fiscal year the staffing at the north sub-station will be increased by another full time clerk. With the success of the north sub-station operation, the Court is also looking at expanding it's off-site operations to the south sub-

station in 1996 and establishing a mobile court unit.

The caseload, off-site applications, records integrity, as well as a desire to evaluate the feasibility of a paperless environment are some of the driving forces behind the study of imaging as an option for this Court.

The original intent of this report was to look at the feasibility of implementing an imaging system at Austin Municipal Court. The scope of the report was expanded to include the decision making process. The report will look at the advantages and disadvantages of an imaging system, the budget impact, including hardware, software and personnel. This report will also look at the decision making process in an attempt to define a model for determining the applicability of a document imaging system. The report will consider the scope of a pilot project if the recommendation is implementation.

REVIEW OF RELEVANT LITERATURE

The review of literature was a search for a blueprint to decide if imaging was a viable option for this Court. It was immediately obvious that the majority of the available literature assumed a position that the decision had been made to implement an optical imaging system.

In the article "Setting up a Paperless Office" the author states that the first questions to ask are "How many documents will be processed? Are the documents one-sided or two-sided? In color or black and white?"¹ The article did not discuss why a paperless office was the right decision or other options in lieu of optical imaging to achieve a paperless office.

In "A Rationale for and the Fundamentals of Electronic Imaging Systems" Mark Langemo discusses a number of factors that generate an interest in electronic imaging. He offers the following as reasons:

1. Hearing or learning that major competitors are considering or implementing imaging.
2. Hearing or learning about the potential of imaging at seminars or conferences.
3. Changes in management.
4. Business reorganization by expansion or "downsizing".
5. Internal forces such as records management staff or management information staff (MIS).
6. An increase in the volume of business, and

7. A belief that systems need to be improved to better serve customers or clients.²

A solution to a specific problem wasn't discussed as a motivating factor. The need for analysis was stated as a need "to find out where the potential opportunities are to improve your organization through the use of electronic imaging systems." Langemo does recommend that the decision should be a group decision involving "senior management, representatives of key units of the organization..., MIS, accounting, finance, human resources and users".³

One of the few cautionary statements was in "Electronic Imaging 101 Part III - Application Analysis, Document Preparation and Digitizing." The author states electronic imaging "should not be cast as a cureall or a magic wand which will miraculously eliminate all document problems."⁴

William Saffady in his presentation of "Electronic Document Imaging and Optical Disks" at the Association of Records Managers & Administrators (ARMA) Austin chapter Records and Information Management conference offered advice as to what he believed were critical issues when making the decision to use optical imaging. Saffady said that the application should require a high level of document retrieval with frequent references as well as a need for rapid retrieval. The application should have documents that are needed by multiple users or remote users.

In the article "Electronic Imaging 101 Part I - What is Electronic Imaging?" Don Avedon gives a checklist for studying, planning for and implementing an electronic imaging system.

Checklist for Studying, Planning for, and Implementing an Electronic Imaging System	
<ul style="list-style-type: none">• Survey<ul style="list-style-type: none"><input type="checkbox"/> Establish a task force<input type="checkbox"/> Inventory records<input type="checkbox"/> Review existing systems<input type="checkbox"/> Determine user requirements<input type="checkbox"/> Establish organizational requirements<input type="checkbox"/> Review literature<input type="checkbox"/> Visit other sites• Feasibility Study<ul style="list-style-type: none"><input type="checkbox"/> Identify applications<input type="checkbox"/> Size the project<input type="checkbox"/> Make cost/benefit analysis<input type="checkbox"/> Consider trade-offs<input type="checkbox"/> Develop a timetable<input type="checkbox"/> Establish technical requirements<input type="checkbox"/> Consider legal issues	<ul style="list-style-type: none"><input type="checkbox"/> Consider standards<input type="checkbox"/> Obtain management approval• Systems Development<ul style="list-style-type: none"><input type="checkbox"/> Establish a strategy<input type="checkbox"/> Develop a detailed design<input type="checkbox"/> Conduct a pilot test<input type="checkbox"/> Prepare RFP/RFQ<input type="checkbox"/> Develop disaster plan• Implementation<ul style="list-style-type: none"><input type="checkbox"/> Do the conversion, if required<input type="checkbox"/> Establish vendor relationships<input type="checkbox"/> Install the system<input type="checkbox"/> Implement disaster plan<input type="checkbox"/> Train operators and users<input type="checkbox"/> Review and evaluate

Avedon's checklist p.30

fig. 2

The author sees some of the advantages and benefits of electronic imaging as very fast retrieval, transmission speed (the request for document and the time it takes to reach the user's desk), improved workflow (the ability to automatically prompt the next step in the procession of documents and the availability of the documents), indexing and cross referencing, ability to integrate electronic imaging with other systems such as word processing and facsimile, good image quality and security

since "write once read many" (WORM) disks cannot be changed.⁵

Langemo sees some possible benefits of imaging as the potential to "re-engineer" and improve work flow, to improve white-collar productivity at lower costs, the ability to have extremely high volume on-line storage of documents with simultaneous access to the documents from remote locations, very fast retrieval of documents, potential for multi-field indexing for thorough searching, effective maintenance and management of filing systems, fast transmission speed, on screen image enhancement and improvement, facsimile capability to transmit documents to other systems, increased security of information, increased potential to integrate information systems, saving of time, space, supplies and related costs and improved staff morale.⁶

To design a model to determine how to make the decision whether a document imaging system is the correct solution, the review of literature was expanded to include project management and problem solving processes. Literature was examined to determine how to make the right decision, why projects fail and advice to avoid failure once the decision to implement was made.

Stephen Keider in the article "Why System Development Projects Fail", said some of reasons for failure are:

1. The lack of a project plan, causing team members to be

unclear about their responsibilities and causing work to be redone because tasks were not performed in a logical fashion.

2. An inadequate definition of the project scope, causing gaps in the new system with required information not available and functions implemented that aren't needed.

3. Lack of meaningful review if the project plan wasn't completed; it would be difficult to review something without a standard to measure against.

4. Lack of anticipation causing potential problems not to be addressed until they have become critical and unmanageable.

5. Lack of courage and the ability to make the hard decisions making dramatic changes to the project including asking the question "Why are we doing this?".

6. Lack of a change control mechanism causing a lack of a procedure for modifying of systems specifications by the end users.

7. Lack of skilled resource and/or training.⁷

Saffady listed some of the reasons why imaging implementations fail as:

1. The application was improperly selected, imaging is a problem solving technology and there must be a problem to be solved to get the benefit.

2. Incomplete or inadequate analysis of requirements.

3. Implementation plan poorly developed, the implementation responsibilities aren't clear and written procedures are

incomplete or absent.

4. The product is inappropriate to the task and the features are unsuitable.

5. Poor performance such as slow response time and software or hardware failure.

6. Promised capabilities aren't delivered.

7. Underestimation of effort and labor requirement involved in document preparation, scanning and data entry.

8. An inadequate plan for user orientation and training.

9. Unrealistic expectations.⁸

A common thread throughout the literature is that projects cannot stand solely on their own merit. Extensive planning and communication is required to successfully complete a project no matter the nature of the project. Project management shares common traits whether the project is relocating an office in a building or building a new court.

Alice Gannon in "Project Management: An Approach to Accomplishing Things" views a project as a three-dimensional model with the first dimension being the elements which the project manager must focus on to accomplish the project goals. Gannon sees the eight elements of the project to be managed as scope, schedule, cost, procurement or contracting, risk, quality, communications and staffing. These eight elements must be juggled and kept in the proper relationship to one another by the

project manager, according to the author.

The second dimension are the various functions the project manager must perform to carry out the projects. These functions include planning, organizing, executing, monitoring, reporting and controlling.

Gannon's third dimension of the project model consists of project-specific tasks unique to each project.⁹

What constitutes a successful project must be decided by and known by all team members involved in the project. Those involved in the project must also realize that some of the project will change even when the "perfect" plan is drafted. The difference in a successful project and a failed project may be in the teams ability to respond to unexpected events.

Stephen Keider in "Why Systems Development Projects Fail" recommends for avoiding failure are: preparing a written project plan, organizing properly (selecting people who will be effective rather than selecting on a basis of availability), delegating (by the project manager) the execution of activities to the team members, anticipating problems and dealing with the short and long range effect, selecting a methodology for systems development, reviewing projects regularly and in depth, causing changes through courageous decisions, maintaining perspective,

and having third-party review.¹⁰

To devise a model for determining the applicability of a document imaging system requires a study of a decision making process. It also requires a study of the characteristics of successful projects.

The Total Quality Management (TQM) problem-solving process design deserves consideration as part of this model. The problem-solving process consists of six steps. The first is identifying and selecting the problem, the next step is to analyze the problem, third - generate potential solutions, fourth - select and plan the solution, fifth - implement the solution and sixth - evaluate the solution.

The TQM problem-solving process is designed to avoid jumping to conclusions before analyzing all aspects of the problem, failing to gather critical data, failing to develop adequate rationale for a solution, failing to involve critical people, and failing to plan adequately how to implement and evaluate the recommended solution.¹¹

TQM is a team-based model. All problems and possible solutions are team decisions and the process is designed to reach consensus. Although part of the process can be successfully integrated into the model, the scope of a document imaging system

Problem-Solving Process

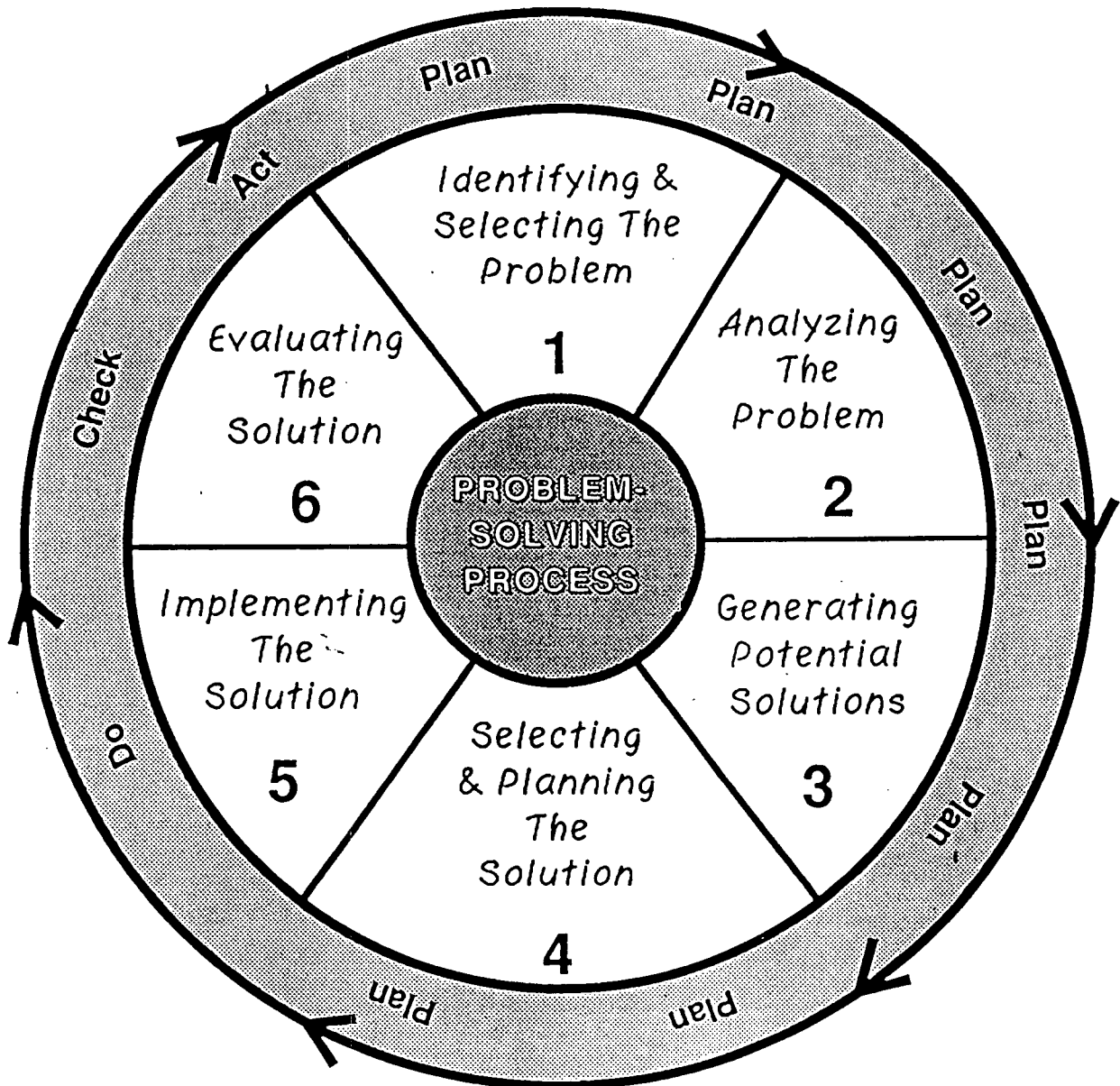


fig. 3

project may be beyond a process looking for group consensus.

Selecting and planning the solution involves a much more intensive treatment than the TQM problem-solving process indicates. The process doesn't take into consideration the need for long range planning, the nature of the Court's business, or the changes that must be made due to legislative mandates.

Michael Hammer's recommendation in "Reengineering Work: Don't Automate, Obliterate" was "stop paving the cow path".¹² He said instead of "embedding outdated processes in silicon and software, we should obliterate them and start over."¹³ If we are searching for consensus, can enough knowledge be brought to the table from a team consisting of "senior management, representatives of key units... and users" recommended by Langemo in "A Rationale for and the Fundamentals of Electronic Imaging Systems"? Could such a group be too close to the "problem" or to a preconceived solution?

In an attempt to find out more about the decision making processes that Courts had undergone to implement, a project manager at Dade County, Florida and Sonoma County, California were contacted. They were asked how the decision to implement was made and who made the decision.

The Dade County Imaging project was begun under the auspices

of an elected clerk. The clerk started the process, without involving the chief judge, with the intent of using the application solely in the clerk's office. After the next election, the incoming clerk, Harvey Ruvin, saw that the program was germane to the clerk's office but needed to be expanded. Ruvin used one of the consultants from the Dade County consortium to conduct their phase I feasibility study and need assessment.

The project expanded to a county-wide program, with plans for the Dade County Court to be the first on-line. The Court is still in it's implementation stage. Their contract with IBM was signed in February 1995.

The Sonoma County Superior Court in Santa Rosa, California implemented an optical disk imaging system in response to a mandate to cut costs by seven percent in a three year period. In lieu of expanding their microfilming of archive cases into an in-house process, the staff decided that a small, dedicated optical disk imaging system would be a better alternative.

The decision to explore the possibility of document imaging was made by the court's Operations Manager. The manager and her assistant researched the cost and impact of a system and presented the information to the Clerk. At that point, a decision to implement was made.

METHODOLOGY

This paper is not a quantitative research but an exploration of a possible future use of a technology. This research paper started out with a simple question. What is the applicability of a document imaging system to a limited jurisdiction court and specifically to Austin Municipal Court? Attempting to answer this simple question, proved to be a complex process.

The Court has been automated with on line updating since August 1985, with a software system that was developed in-house. The Court does not have any design documentation of the system and the system developers aren't employed by the Court. Changes to the system were difficult or impossible. The software was running on a mainframe owned by the Austin Police Department (APD), as a result, the Court was dependent on APD for software and hardware support.

The system had two separate database, parking violations were entered in one and all other violations in the other database. Both applications were limited by the design. A parking ticket could be paid in full or given an extension for payment. Partial payments could not be posted and the system wouldn't accept any diverse judgements. The second database would accept partial payments on traffic and misdemeanor citations but would not disperse the funds until the case was paid in full.

The Court current technology plan is an emphasis on improved customer service through a more efficient operation. The purchase of an AS400 and new a software program was the first step. The Court is in the implementation stage of a new phone system which will include an interactive voice response (IVR) system. The phone system will be operational in May 1995.

The introduction of the hand held ticket writers for parking citations streamlined the processing of parking tickets. Citations are downloaded into the Court's database within two days. This also eliminated one full time equivalent position from the requirement of entering parking citations.

Funds will be requested in the budget to implement a mobile court and an autodialing program. The Court is also planning a work at home program. The pilot program, for the work at home program, would involve the data entry of citations. The use of kiosks for on-line access is a city-wide project and the Court is expected to be one of the initial users.

The Mobile Court would use a customized van to go into neighborhoods and malls to provide additional locations for people to pay fines, set court dates and check on warrants. The autodialing program will be a tool to maximize the collections of revenues and increase the case clearance rate. The system would

be linked to the AS400 and would automatically dial delinquent defendants to remind them of their obligations to the Court.

It is an important part of this process to know exactly what we are doing and why. Document imaging is currently a hot trend in technology. There are obvious benefits to be derived from the technology. The question that needs to be answered is whether this technology is the right solution for this Court at this time.

ANALYSIS

According to the authors of A Basic Approach to Executive Decision Making a model is a "simplified replication of reality that identifies its main components and (usually) indicates how they are interrelated."¹⁴ The American Heritage Dictionary defines a model as "a preliminary pattern serving as the plan from which an item not yet constructed will be produced". Although a model is simplified, the main elements are included and minor nonessentials are excluded. The model is for a particular purpose and a particular audience.

Although models can be designed in various formats, for the purpose of this paper, the model will take the form of a checklist. By definition, a check list is a catalog of factors to be considered in the course of making a decision.¹⁵

To use a model, the scope of the authority of the people following the model must be established. If a team is appointed or a natural team is formed through a work unit, the model can only be successfully applied if the team have enough authority to make decisions. If one person is in the decision making position, that person must be able to set aside pre-conceived ideas of what the problem is and what the solution should be.

STEP ONE

The first step in the checklist is to identify the problem. The identification of the problem can be done in several ways. One is using the TQM method of brainstorming, a method for getting as many ideas as possible, using a selected team to identify the problem. Another method is the use of a survey. The organization can be surveyed in an effort to determine what are considered as major and minor problems by the majority of the staff.

The identification of the problem can be historically known in the company and previously identified through statements such as "we could do this more efficiently if only" or "we can provide better customer service if only".

STEP TWO

Once the problem is identified, the second step in the checklist is the analysis of the problem. This is the data collection phase. This is to confirm that the problem really exists and to determine where and when the problem is most serious. Analyzing the problem may also determine what is causing the problem.

STEP THREE

The next step in the model is determining possible solutions. This step should not have limits imposed. Budget and

other constraints shouldn't be considered at this point in the process. Brainstorming and surveys are once again tools that can be used in this step. With a team, it is a real danger if one person is allowed to dominate the process. All possible solutions must be voiced. One person, one solution will only defeat the process. If the problem being dealt with is an extremely complex one, this step may require a professional consultant to recommend possible solutions.

STEP FOUR

Once possible solutions have been identified, the solution to be implemented must be decided. At this time other issues must be considered. Budgetary impact, the political climate, and time are all important issues that must be dealt with during this step. The support and commitment from top management must be gained to implement the solution. At the same time, thoughts of selling or marketing the solution to all others in the organization must began.

This is also the step where the planning of a successful implementation must began. The scope of the plan should cover:

- "1. What needs to be done (scope).
2. The timing and sequence of the tasks (schedule).
3. How much the tasks will cost (budget).
4. The procurement or contracts required (procurement/contracting).
5. The risks to the project outcomes (risks).

6. The quality of the deliverables and what productivity levels will be required to achieve project goals (quality).
7. How the project manager and project team will communicate in order to perform at the necessary level of quality to produce the deliverables required, at the cost budgeted, and in the time scheduled (communications).
8. What kind of people are required and available to achieve this level of quality (staffing)."¹⁶

APPLYING THE MODEL

To apply the model to the Austin Municipal Court for the purposes of this paper the first two steps must be assumed to have been completed. The Court's caseload, the north sub-station location and the possibility of expanding to other offsite locations and the integrity of the case files have been identified as some of the concerns. These concerns will be used as the definition of the problem and the analysis have shown that these are valid problems.

The next step (three) in the model would be determining possible solutions. This paper will not attempt to address all possible solutions, instead a few solutions will be suggested and some of the issues that will need to be addressed. Some of the possible solutions are:

1. Do nothing - the Court has functioned in the same environment for over two years. The north sub-station operation began in 1993 and the clerks have been able to verify information or obtain additional information by calling the records unit. The security of the case files have improved over the last two years when the records unit was established and a file charge out system was implemented.

The caseload is a natural increase and is being dealt with by an increase in personnel. The records unit have grown from a supervisor and three full time clerks to the present staffing level (a supervisor, a team leader and nine clerks) and will be increased by two additional clerks by the end of the fiscal year.

2. Reimplement the microfilming program and include active case files. The Court previously microfilmed all disposed cases. The Court did not have a records retention schedule and all case files were maintained permanently. The microfilm program was discontinued when the Texas State Library implemented a general retention schedule establishing a five year retention period for disposed municipal court case records.

3. Implement a document imaging system.

4. Implement a microfilm/imaging hybrid system.

5. Hire a consultant to determine the solution to the problem.

In the fourth step of the model, the solution to implement must be decided. To make the decision, an analysis and

comparison of the possible options must be made. The scope of the project, budgetary constraints and political factors must be considered at this point.

William Saffady's comparison of electronic imaging with paper and microfilm systems (fig 4) rates three medium on a scale of 1-5, with 5 equalling excellent. As Saffady emphasized in his speech, this scale is a general outline. The actual ratings would depend on the organization's requirements.

THE BUDGET IMPACT

"DOING NOTHING"

In a comparison of the cost of implementing the solution, the cost of "doing nothing" can be substantial. An increase in offsite operations can result in an increase need for records personnel to respond to requests for information and increase in the number of phone lines. Another possibility, and another cost factor, is the installation of a fax machine at the substations to facilitate the transfer of information.

MICROFILM

The cost of a microfilming system vary tremendously. If the decision to microfilm in-house, an automated stand-alone system can range from approximately \$18,000 to \$35,000. A networked

COMPARISON OF ELECTRONIC IMAGING WITH PAPER AND MICROFILM SYSTEMS

1=poor, 5=excellent

FIG 4

	Imaging	Paper	Microfilm
Rapid retrieval	5	1-2	1-4
Complex retrieval	5	1	1-5
Remote access	5	1	3
Workflow applications	5	2	1
Eliminate misfiling	5	1	5
Document tracking	5	1	3
Revision Control	5	1	3-5
Hardcopy production	5	5	3-4
Ability to fax	4-5	5	2-3
OCR (optical character recognition) applicability	4-5	5	1-2
Protection of documents from wear and tear	5	1-2	5
Storage space	5	1	5
Ease of file creation	1	5	1-3
Media stability	1-2	4-5	5
System independence (ability to be read and maintained without special equipment)	1	5	4-5

system can cost \$100,000.¹⁷ Reader-printers range in price from \$5,000 to \$30,000.¹⁸ These prices do not include personnel cost. Personnel cost includes an increase in staffing for document preparation and the actual filming.

Another option is to have the filming done through a service bureau. The Court in fiscal year 1989-1990 (the last full year the Court microfilmed cases), spent \$55,000 to microfilm disposed cases through the microfilming program in the City of Austin Records Center.

One of the major disadvantages of microfilming, especially active cases, is the delay time waiting for the film processing. Microfilming shares some of the advantages of document imaging such as the reduction of filing space, the reduction of misfiles and the reduction of time needed to file. Microfilming and document imaging can both enhance file integrity.

DOCUMENT IMAGING

A document imaging system cost can also vary tremendously. The system can be a stand alone or can be networked. The throughput speed (the speed which documents are entered) can effect the cost. Normally, the faster the throughput speed, the more the system will cost. The quality of the document image, which is measured by the number of pixels (dots per inch), will

have an impact on the scanning speed and storage, and may have an impact on the cost of the system. The amount of compression that is acceptable may also have an impact on the cost.

Personnel costs includes staff for preparing documents, scanning and indexing. Indexing can be done automatically, which can eliminate or reduce the amount of manual indexing. Normally, automatic indexing works well with highly formatted documents. To use automatic indexing would require form review and revision. (The Court's forms are neither standard in size or format.)

If the decision is made to use manual indexing, it will require skilled personnel for document identification as well as indexing. The double entry of the indexing information is considered the most effective way to eliminate keystroke errors. Failure to minimize indexing error will result in "lost" files.

HYBRID SYSTEM

A hybrid system would take advantage of the benefits of both microfilming and document imaging. Depending on the system, documents can be scanned and filmed simultaneously, scanned then filmed or filmed from the imaged document. The hybrid system will answer the question of how to deal with the high activity phase as well as long term storage.

CONSULTANT

A professional consultant can bring both expertise and enough distance from the problem to better evaluate the solution.

SCOPE OF THE PROJECT

If the solution was to implement a document imaging system, the scope must then be defined.

The Court's caseload consist of traffic citations, Class C misdemeanors and parking citations. Ninety-nine percent of the parking citations are issued by the City Public Works department. These citations are issued using a hand-held ticket writer. The citations are downloaded from the ticket writer to a personal computer and batched uploaded into the Court's computer. Neither the Court or Public Works maintain a hard copy of the citation.

In fiscal year 1993-1994, approximately 24,000 class C misdemeanor cases were filed in the Municipal Court. Class C misdemeanor are either filed directly by a police officer or by a citizen complaint. Of those charges approximately 13,000 were either paid or dismissed by the end of the fiscal year.

Approximately 240,000 traffic citations were issued in fiscal year 1993-1994. Of those citations, over 200,000 were

either paid or dismissed. The rest of the citations are either on a trial track or in a warrant, extension or deferred status.

All citations or complaints are entered into the database by the data processing team or by part of the Magistrate Services staff. The staffing requirement to maintain citation entry at seven days prior to the initial appearance date is 10 full time equivalent data entry clerks.

A possible test phase for implementation of a document imaging system for this Court could be the imaging of all citation filings (except parking tickets issued through the hand-held ticket writers). This would eliminate the need to enter each citation into the database on the keyboard.

ISSUES

Some of the issues that the Court would need to deal with includes:

What happens to the hard copy of the filings?

The Texas Administrative Code (Title 13, Chapter 7) provides that if electronic records, maintained in electronic format only, meets all of the provisions of Title 13 the paper copy may be destroyed. Legally the citations can be discarded once scanned,

but another issue that would have to be dealt with is the comfort level of the judiciary if the paper copy was destroyed.

At what point would a case require a folder?

Currently all citations and complaints are filed in a letter-sized folder, with a color-coded numerical cause number. One of the advantages of document imaging is an ability to eliminate the requirements for folders. This should be a long-term goal for the Court to become a paperless environment. This would require computer terminals in a multitude of places including the courtroom bench. Part of the marketing of a document imaging system to the users would be to make the judiciary comfortable without case folders.

With document imaging, all citations paid or otherwise disposed of without involving a judge would never be placed in a folder. This would reduce significantly the cost of folders. For fiscal year 1994-1995, the Court ordered 275,000 folders at a cost of over \$72,000.

Since all cases are required to have a cause number, the cases that do not require a folder would still have a cause number assigned. The automatic assignment of cause numbers would become an issue. The Court's case management software would have to create two tracks of number assignment. One for

all cases and one for the time a folder is required. If this isn't possible the Court would then need to consider the possibility of purchasing folders without prewrapped numbers.

The standardization of forms.

The standardization of forms should be a minor issue, but it isn't. Citations are issued in different formats depending on the issuing agency. Citations range in size from a 3" by 5" animal violation citation to a 4 1/4" by 8" traffic citation to a 8 1/2" by 11" misdemeanor complaint.

The Court itself uses different forms to accomplish similar actions. The scheduling of court can be done on three different types of form, depending on the type of hearing and whose doing the scheduling. Attempts to standardize the judgement form (from four different forms) has been an on-going project for over nine months and issues have still not been resolved.

CONCLUSIONS

A document imaging system is definitely a viable option for the Austin Municipal Court. The question: Is it the best option? Before a decision can be made to implement a document imaging system, further study is warranted. The model used in theory in this paper, is a viable tool to use in the decision making process. Further expansion and analysis of the possible solutions can provide the answer to the question posed.

The problem(s) to be solved must be defined and understood. The problem(s) must be known before the right decision can be made. Unless the goals and objectives are clearly outlined the project is almost certain to either not deliver what is wanted or needed. This can also result in a complete failure of the project.

The current workflow must be studied and analyzed. The intent should be an improvement in workflow rather than automating the current processes.

The impact of staff, space and equipment requirements for a document imaging system must be fully understood and not minimized. Although, through improved productivity, staffing may be reduced in one area, this reduction may be offset by the staffing needs for preparing documents, scanning and indexing.

To be able to read an imaged document on screen, monitors with high resolution will be required. The resolution need to be high enough to provide a legible display of all documents, including an eight and a half by eleven document. The Court currently has 24 personal computers scattered through the building. The Court has only recently begun purchasing high resolution monitors.

The Court is currently operating with a severe shortage of work space. A bond issue will be placed on a ballot to authorized the expansion of the present building. If the bond election is successful, the intent is to house the record unit on one floor of that extension. If the bond election isn't successful, the implementation of a document imaging system will result in the displacing of some other operation.

Although there are successful imaging programs that were implemented because someone simply thought that it was a good idea, this shouldn't be the case at this Court.

My recommendation, based on research and an awareness of how complicated the decision making process is, would be to pursue the use of a professional consultant to help the Court make the right decision.

ENDNOTES

Endnotes

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GLOSSARY

1. compression - reduction of the amount of information that must be stored for digital document images to conserve optical disk capacity. Compression removes redundant information.
2. Document imaging - system that generate pictorial copies of documents.
3. Electronic document imaging system - computer-based configuration of equipment and software that stores machine-readable, computer-processible document images and their associated character-coded index data, for on-demand retrieval
4. Optical disks - platter-shaped, computer-oriented storage media which permit the recording and/or retrieval of information by optical process.
5. pixel - picture element, the smallest dot that can be transmitted for any given bandwidth used within a scanning or printing system or that can be turned on and off on a display. Digital display resolution is usually given as the number of pixels per scan line and the number of scan lines.
6. scanning - converting documents to machine-readable form required for computer processing and storage on optical disks or other media.

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APPENDIX

TEXAS ADMINISTRATIVE CODE
TITLE 13, CHAPTER 7

§7.71. Definitions. The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise. For local governments, terms not defined in these rules shall have the meanings defined in the Local Government Code, Title 6, Subtitle C, Chapter 201. For state agencies, terms not defined in these rules shall have the meanings defined in the Government Code, §§441.031-441.039 and §§441.051-441.062.

AIIIM-The Association for Information and Image Management.

ANSI-The American National Standards Institute.

Archival record-A record of a state agency scheduled to be reviewed by or that has been approved by an archives for permanent preservation.

Database-(A) collection of digitally stored data records; (B) collection of data elements within records within files that have relationships with other records within other files.

Database Management System (DBMS)-Set of programs designed to organize, store, and retrieve machine-readable information from a computer-maintained database or data bank.

Data file-Related numeric, textual, sound, or graphic information that is organized in a strictly prescribed form and format.

Electronic media-All media capable of being read by a computer including computer hard disks, magnetic tapes, optical disks, or similar machine-readable media.

Electronic record-Any information that is recorded in a form for computer processing and that satisfies the definition of a state record in the Government Code, §441.031(5), or the definition of local government record data in the Local Government Code, §205.001.

Electronic records system-Any information system that produces, manipulates, and stores state or local government records by using a computer.

IEC-International Electrotechnical Commission.

ISO-International Organization for Standardization.

Long-term record-A record for which the retention period on a records retention schedule is 100 years or more but less than permanent.

Medium-term record-A record for which the retention period on a records retention schedule is 10 years or more but less than 100 years.

Records administrator-The person appointed by the head of each state agency to act as the agency's representative in all issues of records management policy, responsibility, and statutory compliance.

Records custodian-The appointed or elected public officer who by the state constitution, state law, ordinance, or administrative policy is in charge of an office that creates or receives local government records.

Records management officer-Each elected county officer or the person designated by the governing body of each local government pursuant to the Local Government Code, §203.025.

Short-term record-A record for which the retention period on a records retention schedule is less than 10 years.

Permanent record-A record for which the retention period on a records retention schedule is permanent.

Text documents-Narrative or tabular documents, such as letters, memorandums, and reports, in loosely prescribed form and format.

§7.72. General.

(a) These rules establish the minimum requirements for the maintenance, use, retention, and storage of all medium-term, long-term, and permanent electronic records of state agencies and local governments, and archival electronic records of state agencies. These rules do not apply to short-term electronic records, but the short-term electronic records of local governments are subject to the applicable provisions of the Local Government Code, Chapter 205.

(b) Unless otherwise noted, these requirements apply to all electronic records storage systems, whether on microcomputers, minicomputers, or main-frame computers, regardless of storage media.

(c) An electronic storage authorization request certifying that these rules will be followed must be submitted to and approved by the director and librarian for all existing electronic storage of medium-term, long-term, and permanent state or local government records and state archival records, and before any new electronic storage of medium-term, long-term, and permanent state or local government records and state archival records. The authorization request must be submitted in a form and manner to be determined by the director and librarian and must be signed by the agency head or designated records administrator (for state agencies), or the records management officer (for local governments).

(d) The agency head or designated records administrator (for state agencies), and the governing body or records management officer in cooperation with records custodians (for local governments) must:

(1) administer a program for the management of records created, received, maintained, used, or stored on electronic media;

- (2) integrate the management of electronic records with other records and information resources management programs of the agency;
- (3) incorporate electronic records management objectives, responsibilities, and authorities in pertinent agency activities;
- (4) establish procedures for addressing records management requirements, including recordkeeping requirements and disposition;
- (5) ensure that training is provided for users of electronic records systems in the operation, care, and handling of the equipment, software, and media used in the system;
- (6) ensure the development and maintenance of up-to-date documentation about all electronic records systems that is adequate to specify all technical characteristics necessary for reading or processing the records and the timely, authorized disposition of records; and
- (7) specify the location and media on which electronic records are maintained to meet retention requirements and maintain inventories of electronic records systems to facilitate disposition.

(e) With the exception of subsections (c) and (f) of this section, which are effective immediately, state agencies and local governments must be in compliance with the Standards and Procedures for Electronic Records on or before January 2, 1995.

(f) Any electronic recordkeeping system not meeting the provisions of these rules may be utilized for medium-term, long-term, or permanent state or local government records and state archival records provided the source document, if any, or a paper copy is maintained, or the record is microfilmed in accordance with the specifications in *American National Standard for Imaging Media (Film) — Silver-Gelatin Type — Specifications for Stability* (ANSI IT9.1-1989 or latest revision) for state records or in accordance with the provisions of Local Government Code, Chapter 204, and the rules adopted under it for local government records.

.73. Creation and Use of Data Files.

(a) Disposition instructions for the data must be incorporated into electronic records systems that produce, use, and store data files.

(b) State agencies and local governments must maintain up-to-date technical documentation for each electronic records system that produces, uses, and stores data files. Minimum documentation required is:

- (1) a narrative description of the system;
- (2) the physical and technical characteristics of the records, including a record layout that describes each field including its name, size, starting or relative position, and a description of the form of the data (such as alphabetic, zoned decimal, packed decimal, or numeric), or a data dictionary, or the equivalent information associated with a database management system including a description of the relationship between data elements in databases; and
- (3) any other technical information needed to read or process the records.

.74. Creation and Use of Text Documents.

(a) Electronic records systems that maintain the official file copy of text documents or data used to generate the official copy of text documents on electronic media must meet the following minimum requirements:

- (1) provide a method for all authorized users of the system to retrieve desired documents, such as an indexing text search system;
- (2) provide security to ensure integrity of the documents;
- (3) provide a standard interchange format when determined to be necessary by the agency or local government permit the exchange of documents on electronic media among the components of the agency or local government using different software/operating systems; and
- (4) provide for the disposition of the documents including, when necessary, the requirements for transferring archival records to the State Archives as detailed in §7.77 of this title (relating to Retention of Electronic Records).

(b) A document created on an electronic records system must be identified sufficiently to enable authorized personnel retrieve, protect, and carry out the disposition of documents in the system. Agencies must ensure that records maintained in such systems can be correlated with related records on paper, microform, or other media.

.75. Security of Electronic Records.

(a) State agencies and local governments must implement and maintain an electronic records security program for office and storage areas that:

- (1) ensures that only authorized personnel have access to electronic records;
- (2) provides for backup and recovery of records to protect against information loss;
- (3) ensures that personnel are trained to safeguard confidential electronic records;
- (4) minimizes the risk of unauthorized alteration or erasure of electronic records; and
- (5) documents that similar kinds of records generated and stored electronically are created by the same processes each time and have a standardized retrieval approach.

(b) A duplicate copy of essential records and any software or documentation required to retrieve and read the records must be maintained in a storage area located in a separate building from the building where the records that have been copied are maintained.

(c) For all permanent records stored on rewritable electronic media, the system must ensure that read/write privileges are controlled and that an audit trail of rewrites is maintained.

§7.76. *Maintenance of Electronic Records Storage Media.*

(a) State agencies and local governments must ensure that the accuracy, completeness, and accessibility of information are not lost prior to its authorized destruction date because of changing technology or media deterioration, by converting electronic storage media and taking other action as required to provide compatibility with current hardware and software. The migration strategy for upgrading equipment as technology evolves must be documented and include:

- (1) periodically recopying to the same electronic media as required, and/or transferring of data from an obsolete technology to a supportable technology; and
- (2) providing backward system compatibility to the data in the old system, and/or converting data to media that the system upgrade and/or replacement can support.

(b) Paragraphs (1)-(3) of this section outline the maintenance of backup electronic media stored offsite.

(1) Magnetic computer tapes must be tested and verified no more than 6 months prior to using them to store electronic records. Pretesting of tapes is not required if an automated system is used that monitors read/write errors and there is a procedure in place for correcting errors.

(2) The storage areas for electronic media must be maintained within the following temperatures and relative humidities:

(A) for magnetic media-65 degrees Fahrenheit to 75 degrees Fahrenheit, and 30% to 50% relative humidity;

(B) for optical disks-storage environmental conditions as specified in *Information technology—130 mm optical disk cartridge, write once, for information interchange* (ISO/IEC 9171-1, 1990 or latest revision).

(3) A random sample of all magnetic computer tapes must be read annually to identify any loss of data and to discover and correct the causes of data loss. At least a 10% sample or a sample size of 50 magnetic tapes, whichever is less, must be read. Tapes with unrecoverable errors must be replaced and, when possible, lost data must be restored. All other tapes which might have been affected by the same cause (i. e. poor quality tape, high usage, poor environment, improper handling) must be read and corrected.

(c) State agencies and local governments must recopy data maintained on electronic media according to the following schedule.

(1) Data maintained on magnetic tape must be recopied onto new or used tape a minimum of once every three years.

(2) An alternative option for recopying magnetic tape is for the data to be recopied onto new tape a minimum of once every ten years, provided the tape is rewound under controlled tension every three and one-half years. The requirement for rewinding does not apply to 3480-type tape cartridges.

(3) Data maintained on optical disks must be recopied a minimum of once every 10 years.

(d) Floppy disks (diskettes) or any type of flexible disk system may not be used for the exclusive storage of medium-term, long-term, or permanent records and state archival records.

(e) External labels, or an eye-readable index relating to unique identifiers, for electronic media used to process or store electronic records must include the following information:

- (1) name or other identifier of the organizational unit responsible for the records;
- (2) descriptive title of the contents;
- (3) dates of creation and authorized disposition date;
- (4) security classification;
- (5) identification of the software (to include specific application if appropriate) and hardware used; and
- (6) system title, including the version number of the application.

(f) Additionally, the following information must be maintained for electronic media used to store permanent electronic records:

- (1) file title(s);
- (2) dates of coverage;
- (3) the recording density;
- (4) type of internal labels;
- (5) volume serial number, if applicable;
- (6) the number of tracks;
- (7) character code/software dependency;
- (8) information about block size;
- (9) sequence number, if the file is part of a multi-media set; and
- (10) relative starting position of data, if applicable.

(g) The following standards must be met for electronic records stored as digital images on optical media.

(1) A non-proprietary image file header label must be used, or the system developer must provide a bridge to a non-proprietary image file header label, or the system developer must supply a detailed definition of image file header label structure.

(2) The system hardware and/or software must provide a quality assurance capability that verifies information that is written to the optical media.

(3) Periodic maintenance of optical data storage systems is required, including an annual recalibration of the

tical drives.

(4) Scanner quality must be evaluated based on the standard procedures in *American National Standard for Information and Image Management — Recommended Practice for Quality Control of Image Scanners* (ANSI/AIIM MS44-1988 or latest revision).

(5) A visual quality control evaluation must be performed for each scanned image and related index data.

(6) A scanning density with a minimum of 200 dots per inch is required for recording documents that contain no type font smaller than six point.

(7) A scanning density with a minimum of 300 dots per inch is required for engineering drawings, maps, and other documents with background detail.

(8) The selected scanning density must be validated with tests on actual documents.

(9) The use of the Consultative Committee on International Telegraphy and Telephony (CCITT) Group 3 or Group 4 compression techniques is required for document images without continuous tonal qualities. If use of a proprietary compression technique is unavoidable, the vendor must provide a gateway to either Group 3 or Group 4 compression techniques.

(10) Optical drive systems must not be operated in environments with high levels of airborne particulates.

(11) All aspects of the design and use of the imaging system must be documented, including administrative procedures for digital imaging, retrieval, and storage; technical system specifications; problems encountered; and measures taken to address them, including hardware and software modifications.

(h) Smoking, drinking, and eating must be prohibited in electronic media storage areas.

7.77. *Retention of Electronic Records.*

(a) State agencies and local governments must establish policies and procedures to ensure that electronic records and any software, hardware, and/or documentation, including maintenance documentation, required to retrieve and read the electronic records are retained as long as the approved retention period for the electronic records.

(b) The retention procedures must include provisions for:

(1) scheduling the disposition of all electronic records, according to statutory requirements, as well as related software, documentation, and indexes; and

(2) establishing procedures for regular recopying, reformatting, and other necessary maintenance to ensure the retention and usability of electronic records until the expiration of their retention periods.

(c) State records having archival value and scheduled to be preserved at the State Archives must be transferred to the State Archives as the source document, or printed out on alkaline paper for computer generated information, or on microforms that meet the specifications in *American National Standard for Imaging Media (Film) — Silver-Gelatin Type — Specifications for Stability* (ANSI IT9.1-1989 or latest revision).

7.78. *Destruction of Electronic Records.*

(a) Electronic records may be destroyed only in accordance with a records schedule approved by the director and librarian or designee or, in lieu of an approved records schedule, an approved records disposition authorization request.

(b) Each state agency and local government must ensure that:

(1) electronic records scheduled for destruction are disposed of in a manner that ensures protection of any confidential information; and

(2) magnetic storage media previously used for electronic records containing confidential information are not reused if the previously recorded information can be compromised by reuse in any way.

(c) The court ordered expungement of information recorded on an optical Write-Once-Read-Many (WORM) system must be implemented according to the recommendations provided in *Technical Report for Information and Image Management — The Expungement of Information Recorded on Optical Write-Once-Read-Many (WORM) Systems* (AIIM TR28-1991 or latest revision).

7.79. *Public Access to Electronic Records.* An electronic recordkeeping system must not provide an impediment to access to public records.

The Office

BUYERS' GUIDE TO MICROGRAPHIC READERS & READER-PRINTERS

Specifications in these charts were provided by the manufacturers.

Prices are current as of this issue.

MANUFACTURER Reader Service Card No.	MODEL	PRICE	Reader, Printer, Viewer	Copying Process	Printing Speed (cpm, * ppm)	Screen Size (in inches)	Magnification (X)	Maximum Print Size (in inches)	16mm Roll	35mm Roll	Cartridges/Cassettes	Fiche-Jackets	Aperture Cards	Image Rotation	Page Search	Zoom Lens	On-Line to Computer
A.B. Dick Co. Circle No. 200	871 Rear Proj.	\$ 340	R			11x11	18-65					•					
	872 Front Proj.	269	R				18-65										
	873 Rear Proj.	435	R				24-54							•			
Alos Micrographics Corp. Circle No. 201	Z40 Reader-Printer	POR	RP	1	6	12x12	18-36	8½x11	•	•		•		•	•	•	
	RT30 Roll Film Terminal	POR	R			12½x11¾	20-61		•					•	•		
	22E	POR	R			13x12	18-65		•					•	•		
Anacomp, Inc. Circle No. 202	MC100	1995	RP	1,6	6	11x11	24, 42, 48	8½x11	•	•	•	•	•	•			
	MC1000	2995	RP	1,6	8	11	15-60	8½x11	•	•	•	•	•				
	MC1000XT	3695	RP	1,6	10	11	15-60	8½x11	•	•	•	•	•				
	MC5000	7995	RP	1,6	11	11	15-60	8½x11	•	•	•				•		•
	MC2000	4695	RP	1,6	10	11	15-60	8½x11	•	•	•				•		•
Bell & Howell Circle No. 203	7700	16,800	RP	1	20	12¼x17½	6	11x17	•					•	•	•	•
	7100	11,800	RP	1	20	12¼x17½	6	11x17	•	7				•	•	•	•
	4000	3500	RP	1	7	12x12	6	8½x11	•	•				•			
	ABR 2000	2700	RP	1	6	12x12	6	8½x11	7	7				•		•	
Canon U.S.A., Inc. Circle No. 204	MP50	1960	RP	1	4	8½x11	17.2-47	8½x11	•			•		•		•	
	MP60	2950	RP		8	11¼x11¾	17-47	8½x11	•	•		•	•	•		•	
	MP90	3740	RP		10	11¼x11¾	9.5-8.5	8½x11	•	•	•	•	•	•	•	•	•
	NP680	10,350	RP	1	15	12¼x17½	7.53	11x17	•	•	•	•	•	•	•	•	•
	NP780FSII	15,080	RP	1	20	12¼x17½	18-53	11x17	•		•			•	•	•	•
Connecticut Micrographics Inc. Circle No. 205	Astri 16	610	R			12x10	24		•		•			•			
	Astri 16 ⁵	825	R			12x10	24		•		•			•			
Dukane Corp. Circle No. 206	27A77A	1683	R			14x14	15-42		•	•	•						
	27A88A	1453	R			18x20			•	•			•				
	27A66	588	R			14x14	15-27		•	•		6	6				

BUYERS' GUIDE TO MICROGRAPHIC READERS AND READER-PRINTERS (Continued)

MANUFACTURER Reader Service Card No.	MODEL	PRICE	Reader, Printer, Viewer	Copying Process	Printing Speed (cpm, *ppm)	Screen Size (in inches)	Magnification (X)	Maximum Print Size (in inches)	16mm Roll	35mm Roll	Cartridges/Cassettes	Fiche-Jackets	Aperture Cards	Image Rotation	Page Search	Zoom Lens	On-Line to Computer
Eastman Kodak Co. Circle No. 207	Starmate 550	\$3708	RP	1	9	12x12	18-56	8½x11	•	•	•	•	•	•	•	•	•
	Startech II	11,825	RP	1	12	12x12	16-48	8½x11	•	•	•	•	•	•	•	•	•
	IMT-250	13,972	RP	1	10	12x12	16-48	8½x11	•	•	•	•	•	•	•	•	•
	IMT-350	19,857	RP	1	10	12x12	16-48	8½x11	•	•	•	•	•	•	•	•	•
	Imagelink Digital Workstation	24,585	RP	1	22	12x12	14-50	11x17	•	•	•	•	•	•	•	•	•
Ercona Corp. Circle No. 208	20X-ERC	45.95	R				20				•	•					
Eye Communication Systems, Inc. Circle No. 209	EC1000	POR	R			8½x10¾	16-24		•	•	•	•	•	•	•	•	•
	EC1100	POR	R			11x11	24-54		•	•	•	•	•	•	•	•	•
	EC2000	POR	R			9½x12¾	19-65		•	•	•	•	•	•	•	•	•
	EC3000	POR	R			11x14	21-72		•	•	•	•	•	•	•	•	•
	EC9000	POR	RP	1	4	8½x11½	19-94	8½x11	•	•	•	•	•	•	•	•	•
Fuji Photo Film U.S.A., Inc. Circle No. 210	MS850	7605	RP	8	8	12x12	20-50	8½x11	•	•	•	•	•	•	•	•	•
	MS6000	28,000-40,000	RP	9	14*	11¾x16½	7.5-50 ⁶	11x17	•	•	•	•	•	•	•	•	•
Indus International, Inc. Circle No. 211	4601-01	POR	R			14x11	24-90		•	•	•	•	•	•	•	•	•
	4601-01J	POR	R			14x11	24-90		•	•	•	•	•	•	•	•	•
	456D-800E	POR	R			20x13	12.5, 24		•	•	•	•	•	•	•	•	•
	456-Brief Case	POR	R			11x11	24-48		•	•	•	•	•	•	•	•	•
	456-113	POR	R			4	24		•	•	•	•	•	•	•	•	•
Infographic Circle No. 212	Image Print 100AT	2395	RP	1	8	12x12	12-72	8½x11	•	•	•	•	•	•	•	•	•
MicroFilm Enterprises Corp. Circle No. 213	ME-R 16/24 MQT.	POR	R			15x15	24,32		•	•	•	•	•	•	•	•	•
	ME-R 16/24 MAN.	POR	R			15x15/15x8	24, 32		•	•	•	•	•	•	•	•	•
	ME-R 16/20	POR	R			11x14	20		•	•	•	•	•	•	•	•	•
	ME-R 35/12	POR	R			15x15/15x8	12, 15		•	•	•	•	•	•	•	•	•
	ME-R 35/12 PORT.	POR	R			15x15	12		•	•	•	•	•	•	•	•	•
Minsolta Corp. Circle No. 214	RP 607Z	POR	RP	10	22	11x17	7.5-50	11x17	•	•	•	•	•	•	•	•	•
	RP 609Z	POR	RP	10	6	18x24	7-24	18-24	•	•	•	•	•	•	•	•	•
	RP 6002	POR	RP	10	6	12x12	18-46	8½x11	•	•	•	•	•	•	•	•	•
	RP 6052	POR	RP	10	10	12x12	9-87	8½x11	•	•	•	•	•	•	•	•	•
	RP 606Z	POR	RP	10	10	12x12	7.5-50	10x14	•	•	•	•	•	•	•	•	•
Tameron, Inc. Circle No. 215	T-36	29,650	RP	1	20 ²	20x26	7.4-32	36-56	•	•	•	•	•	•	•	•	•
	1970	59,000	RP	1	51		17.4-24.4	17x22			•	•	•	•	•	•	•
	6000-R	51,900	RP	1	60		4.5-52	17x22 ⁴	•	•	•	•	•	•	•	•	•
Taylor-Merchant Corp. Circle No. 216	77R-51L	5.50	V ⁵								•	•	•	•	•	•	•
	77R-81L	6.75	V			1¼					•	•	•	•	•	•	•
	77R-16LM	79.50	V			1¼					•	•	•	•	•	•	•
	77R-22VHR	82.50	V			1¼					•	•	•	•	•	•	•

Reader-Printer Specifications

The following specifications for Micrographic Readers and Reader-Printers (pages 74-75) were provided by the individual manufacturers listed.

1. Plain paper.
2. Given as inches per minute.
3. Uses paper roll.
4. Hand-held.
5. Uses battery or 110V current.
6. Consult vendor.
7. Uses open spool type.
8. Electrostatic.
9. Laser.
10. Dry toning.

EXHIBIT 2

Prices of document imaging software

Vendor/product	Stand-alone (1 user)		Network (5 users)		Network (10 users)	
	DOS	Windows	DOS	Windows	DOS	Windows
Pagekeeper Caere Corp. 100 Cooper Court Los Gatos, California 95030 (800) 535-7226	N/A	\$595	N/A	\$1,995	N/A	\$3,990
Ultra Series Courtland Group 10480 Little Patuxent Parkway Columbia, Maryland 21044 (410) 730-7668	\$2,795	\$2,795	N/A	N/A	\$6,795	\$6,795
AV Image Data General 4400 Computer Drive Westboro, Massachusetts 01580 (800) 344-6736	N/A	N/A	N/A	\$4,270	N/A	\$7,745
Personal Edition Workgroup Edition Enterprise Wide plus Keyfile Desktop Edition (OS/2 server) Keyfile Corp. 22 Cotton Road Nashua, New Hampshire 03063 (603) 883-3800	N/A	\$595	N/A	\$2,995	N/A	\$15,945
Recollect Mindworks 735 North Pastoria Sunnyvale, California 94086 (408) 730-2100	N/A	\$595	N/A	*	N/A	*
PaperClip PaperClip Imaging Software Continental Plaza 1 401 Hackensack Ave. Hackensack, New Jersey 07601 (201) 487-3503	\$1,995	\$595	\$10,850	\$4,995	\$15,825	\$9,970
PCDOCS Open PCDOCS Inc. 124 Marriott Drive Tallahassee, Florida 32301 (800) 933-3627	N/A	N/A	\$1,620	\$1,990	\$2,745	\$3,485
SoftSolutions SoftSolutions Technical Corp. 1555 North Technology Way Building H Orem, Utah 84057 (801) 226-6000	\$495	\$595	\$1,940	\$2,525	\$3,385	\$4,445
File Majic WestBrook Technologies, Inc. 22 Pequot Park Road Westbrook, Connecticut 06498 (203) 399-7111	N/A	\$1,495	N/A	N/A	N/A	\$3,495

*To be released.

Appendix 3-1

EXHIBIT 3

**Document imaging hardware costs
for a stand-alone system**

Stand-alone workstation
for scanning, indexing,
database storage, search
and retrieval and display:

386/33 with 8 Mb of RAM and a 200-Mb hard drive.....	\$1,150
NEC MultiSync 4FGe 15-inch monitor with 1024-by-768 resolution and a 76-hertz refresh rate	\$755
ATI Graphics Ultra Plus 2-Mb video accelerator card.....	\$310
Internal optical WORM drive (5.25-inch, 940-Gb Panasonic LF5010 with adapter).....	\$2,470
250-Mb Conner Tapestor internal tape backup for the index database	\$150
Hayes fax-modem board	\$200
Hewlett-Packard ScanJet IIP grayscale scanner with feeder.....	\$1,000
Texas Instruments Microlaser Plus printer with 300-by-300 dot-per-inch resolution	\$850
Total.....	\$6,885

EXHIBIT 4

**Document imaging hardware costs
for a networked configuration**

2 NEC MultiSync 4FGe 15-inch monitors with 1024-by-768 resolution and a 76-hertz refresh rate	\$1,510
2 ATI Graphics Ultra Plus 2-Mb video accelerator cards.....	\$620
2 internal optical WORM drives (5.25-inch, 940-Gb Panasonic LF5010 with adapter).....	\$4,940
Hewlett-Packard ScanJet IIP grayscale scanner with feeder	\$1,000
Total.....	\$8,070