

# Paper, Microfilm and Imaging Systems

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**Abstract**—Advances in the technology used to produce imaging systems have led to cost effective application of imaging systems in business areas previously thought to be too small. A process of a) understanding the exact requirements of the business area, b) understanding the available technology, and c) designing a system that meets those requirements results in a system that is very cost effective and scales to meet future needs as they arise. Imaging systems can now be built with a superset of the capabilities of microfilm machines with about the same initial cost and a much lower long term cost of ownership.

## I. INTRODUCTION

THERE is still a place for manual processes. When volumes are low, the simplicity of a manual process is worth more than the benefits of an automated process. Overheads associated with new equipment purchase and process changes are not typically paid back by low volumes. Furthermore, companies that are growing quickly often choose not to automate because they have pressing priorities that prevent fine tuning of each internal process. In general, when things are going well, there is little motivation to change internal processes. These are some of the reasons why many companies have used a manual paper handling process for their archives.

However, as the volume of paper becomes high the overheads of automation become less significant. Automation becomes necessary just to survive. Manually handling large volumes of paper is costly in many ways: office space consumed by the files is at a premium, excess

labor is expended (often by professional staff) to manually move through boxes or cabinets of paper searching for a document, response time to an urgent need for a document is compromised, and perhaps worst of all paper files leave one exposed to the risk of lost documents due to misfiling. Any organization that operates under the regulation of a government body (such as health care related, financial, legal and utilities) must protect themselves from the legal consequences of an inability to produce a document that they are required to keep.

When these conditions exist, the need to automate no longer remains a question. The question is what technology to use.

## II. EVOLUTION OF IMAGING TECHNOLOGY

In the 1930's, advances in photographic techniques were applied to the problem of managing large volumes of paper. Microfilm reduced storage space and reduced misfiles. Access to information on film was slow due to the time to mount, rewind and dismount rolls of film and the print quality was inconsistent, but the cost savings were enough that microfilming technology was a commercial success. Through the late 1970's and 1980's, office information was increasingly computerized and the advantages of instant access to information on a desktop computer became available. Professional employees who needed access to information stored on film became less satisfied with microfilm machines, but microfilm continued to be tolerated because there was some information that originated on paper and could not be converted cost effectively to a computerized format.

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**Table 1 Comparison of archiving approaches**

Feature	Paper-based	Microfilm	Imaging System
Filing Time	Slow	Fast	Fast
Document labeling (imprinting)	hand written or stamped	automatic	depends on system, should be automatic
Check image exposure (QA)	not applicable	only after full roll of film is processed	immediate
Storage space	requires a warehouse	can store in an office	uses a fraction of the microfilm space
Access to documents after filing, filming or scanning	immediate	several days' wait	immediate
Retrieval time	slow to excruciating	medium	fast
Clarity of printed copy	good	variable	good
Transmit images to other computers	not possible	not possible	several offices concurrently access one document
Fax to remote location	manual	print document, then manual fax	sent directly via phone lines
Add attachments to filed doc	any time	not possible	any time
Work environment	storage room conditions, high turnover	dot matrix labelers are too loud for the office	ink jet is quiet, high tech office environment
Ease of use	low skill, must teach filing system	tedious	depends on system, should be fun to use
Convert images to text	not possible	not possible	available (OCR)
Fast text-based searching	not possible	not possible	available

However, the technology available to handle document archives has changed dramatically. Recent advances have greatly reduced the cost of computer based systems to archive and retrieve images of paper documents. Older systems that are locked into expensive mainframe or mini computer platforms still cost \$100K and more. But newer systems using high performance desktop computers outperform their predecessors and cost far less. The advantages of imaging systems summarized in Table 1 are now available for the same initial cost as microfilm machines. The benefits shown above translate into long term cost savings that result in a lower cost of ownership for the entire document storage and retrieval process.

A number of general purpose imaging systems are now on the market. Most of these do not meet

the needs of large document archives. This is due to the presence of older technology, some missing features and some unnecessary features in the systems.

Unnecessary features cause a high system price, long learning times and sometimes even require that the customer learn a programming language! Some systems require a great deal of data entry as each document is scanned. Data entered into the imaging system's database then overlaps with the data in the organization's mainframe database. Inconsistencies and contradictions build up as minor errors are made or corrected in one place or the other. The requirement to enter data for each page as it is scanned slows throughput to the point where a large support staff is required just to handle incoming documents.

### III. THE SOLUTION

What is required is a system that is specifically tailored to meet the needs of the individual organization's document archive. Planning such a system must begin with an understanding of the organization's current work flow and business environment. This is combined with an understanding of available technology to define the requirements of a document archive system that will be successful for the organization.

The document archive system must include consideration of

- existing mainframe and network installations,
- staffing level and skill set,
- the quantity and types of paper arriving,
- the paper's processing steps, and
- the quantity and urgency of paper retrieved.

Analysis of these parameters may result in the conclusion that a microfilm machine provides all of the necessary functions. However, microfilm machines are nearing the end of their life cycle. From 1990 to 1991, the total market of digital

imaging grew 19% and micrographics fell 2%\*. This trend is due to the fact that an imaging system can be purchased at a similar initial cost, but offers long term advantages that can both reduce the long term cost and improve access to archived information. Imaging systems provide an upward path that will keep the organization in step with the future direction of information management. They can be enhanced to offer substantial new functions in the future that will never be available with microfilm.

While costs savings alone may be sufficient reason to use an imaging system, better access to information can be used to improve service to customers, make more informed decisions and accelerate internal business processes. In an increasingly information intensive business climate, the strategic and competitive advantages of better access to information can make a substantial contribution to future success of the organization.

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\* Phillip R. Trapp, President of the Association for Information and Image Management, "Imaging World", June, 1992, p.27.