The AutoEDMS Document Management & Workflow System

An Overview of Key Features, Functions and Capabilities

ACS
SOFTWARE

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Introduction

This report is a general overview of AutoEDMS' capabilities and features, as they relate to specific document management issues. Additional details can be provided for specific requirements, upon request.

The AutoEDMS Document Management System was first released in 1986, under the name of "10CAD EDMS". 10CAD EDMS was the first, commercially available, PC-based Drawing and Document Management System. Since then, there have been twelve major releases of the AutoEDMS system, with thousands of users worldwide, including:

ABB Flexible Automation	Merillat Corp.
A-DEC	Mill-Max Mfg.
Agam Motoren Rotterdam B.V.	Minnkota Power Cooperative
Altos Hornos de Mexico S.A.	Morgan Corporation
Amsterdam Airport – Schiphol	Napa Pipe Co.
Applied Precision	NASA Langley Research Center
Argonne National Laboratories	NAV Canada
AW North Carolina	NBC
Batelco (Bahrain Telecom)	NB Tel
Berg Steel Pipe	Nebraska Public Power District
Carver Boat Corp.	New Brunswick Telephone
Chevron	Nutone Corp
Delta Nuts Bedrijven N.V.	Oremet-Wah Chang
Denso Mfg. Tennessee, Inc.	Petromin Shell Refinery Co
Detroit Edison	Philadelphia Electric Company
Durr Industries	Philips B.V.
Dyncorp	Raytheon Technical Services Co.
Elf Oil UK Ltd	Saint John Port Authority
Epik Communications	Santa Clara Valley Water District
Erico Inc.	Saudi Aramco Shell Refinery Co.
Freeport McMoRan Copper & Gold Mines	Standard Communication Corp.
Fru-Con	Stupp Brothers Bridge & Iron Co.
General Kinetics	The Kirlin Company
GQ Parachutes	The New Zealand Refining Company
Hutchinson Technology, Inc.	U.S. Filter/Wheelabrator
Inductotherm Corp	Valero – Memphis Refinery
Ipsco Tubular Inc.	VATech (Reyrolle Transmission)
Irving Oil	Washington Dept. of Fish & Wildlife
Lawrence Berkeley National Labs	Webster Industries
Lightwave Electronics	U.S. Western Area Power Administration
Mars B.V.	Zellstoff Celgar

Major manufacturing and engineering firms have traditionally used AutoEDMS for departmental and enterprise-wide management of CAD drawings, scanned images, electronic documents and hard-copy files. Many AutoEDMS installations are now managing over 500,000 documents per database, quickly and reliably.

Easily handles over 1 million or more documents

Throughout this report, there are references to two key AutoEDMS technologies – *Attaché* functions and the *ACL* customization language. These are two key customization tools that are used to implement customer-specific document management features and functions. Additional details about these customization tools can be found later in this report. None of the document management solutions presented require any source-code level modifications to AutoEDMS or advanced programming.

AutoEDMS offers clients a flexible, powerful and proven, LAN, WAN and Internet-based document management solution. AutoEDMS can be quickly implemented to meet your needs of 'today', yet it's extensible and powerful enough to grow and expand to meet all your future requirements.

ACS Software, Inc.

Established in 1981, ACS Software, Inc. is the developer of the AutoEDMS document management and workflow solution, and has been providing software and services designed for workgroups and multi-site enterprises. ACS Software delivered the first PC-based EDMS system back in 1986, and since then, there are now thousands of AutoEDMS customers worldwide, in a wide variety of industries. ACS supports clients throughout North America and in over 25 countries. ACS Software, Inc. is headquartered in Torrance, California; just 20 minutes south of the Los Angeles International airport. ACS also has offices in MI, AZ and Vancouver, Canada.

ACS' Application Engineers work closely with the marketing and development teams, distributors, resellers and our own customers on new features, functions and mission critical components, making AutoEDMS consistently one of the most robust and user-oriented EDM systems on the market. This real-world hands-on experience gives ACS a real advantage with its product development.

AutoEDMS

AutoEDMS has constantly evolved and improved since its first release. It has proven itself to be one of the most reliable and robust database management products on the market. From the very beginning, AutoEDMS has been a network product, with client/server database architecture, boasting high-end fidelity with low cost of ownership.

AutoEDMS was the first EDM (engineering data management) system to manage CAD files (AutoCAD, Microstation, etc.), straight out-of-the-box, when it was initially introduced back in the late eighties. Over the years, AutoEDMS has expanded its support to all popular Windows applications. During its evolution AutoEDMS has been a leading and innovative product, with features such as built in file viewing, customizable database and Form design, document management specific RAD (rapid application development) language (ACL), visual workflow design, scalability (standalone, LAN , WAN and Web support), to name a few. ACS Software's products are sold worldwide through an authorized reseller channel.

What's included

AutoEDMS is targeted at the engineering and manufacturing markets, with the design philosophy of providing at least 80 percent of the desired solution straight out-of-the-box,

while including the tools necessary to complete the remaining 20 percent. This 20 percent figure represents the "unique" requirements of most users.

EDM systems can be expensive to implement and maintain, and expanding the system (*if* the EDM product is even capable of it) can require a very high skill level. AutoEDMS, on the other hand, has been designed to implement at the lowest cost possible. For example, it is ready to use straight out-of-the-box, while facilitating unbound growth and expansion without the need of expensive developers and development tools.

ACS Software has identified that extensive development tools like 'C', or Visual Basic, are overkill for most EDM customization projects. So, the built-in ACL language is ideal for the majority of customization and development needs. ACS Software is aware that most companies don't have a full-time developer on staff, but do have people available for implementing in-house projects. The AutoEDMS ACL language is aimed at these people.

AutoEDMS provides 80% of your EDM requirements, straight out-of-the-box

In addition, the system uses an open architecture, such as its "ODBC-compliant" database, so that it can be integrated with other systems using development tools like Visual Basic, 'C', Java, etc.

ACS Software also recognizes that if possible, organizations would like to standardize on one EDM system for all their departments and future needs. AutoEDMS has this capability. AutoEDMS may start in the engineering department, but it is just at home in sales, support, services, the print room and other departments.

In a nutshell, AutoEDMS is an EDM/DM system that combines many features usually associated with enterprise wide solutions, but at a departmental price.

Features

The following list of features highlights a number of the key technologies and solutions for LAN, WAN and Internet based document management with AutoEDMS. Most of the feature descriptions have been condensed, in order to give a concise review of AutoEDMS' capabilities.

Client/Server Document Database

AutoEDMS supports LAN, WAN and Internet-based document management, by implementing distributed, client/server databases. This provides AutoEDMS users with high-speed, local document management using local document databases, with direct LAN, WAN and Internet links to other departments and sites for query/view/print/edit access to remote documents. In all cases, AutoEDMS provides complete file and record locking control, for simultaneous document access by local and remote users.
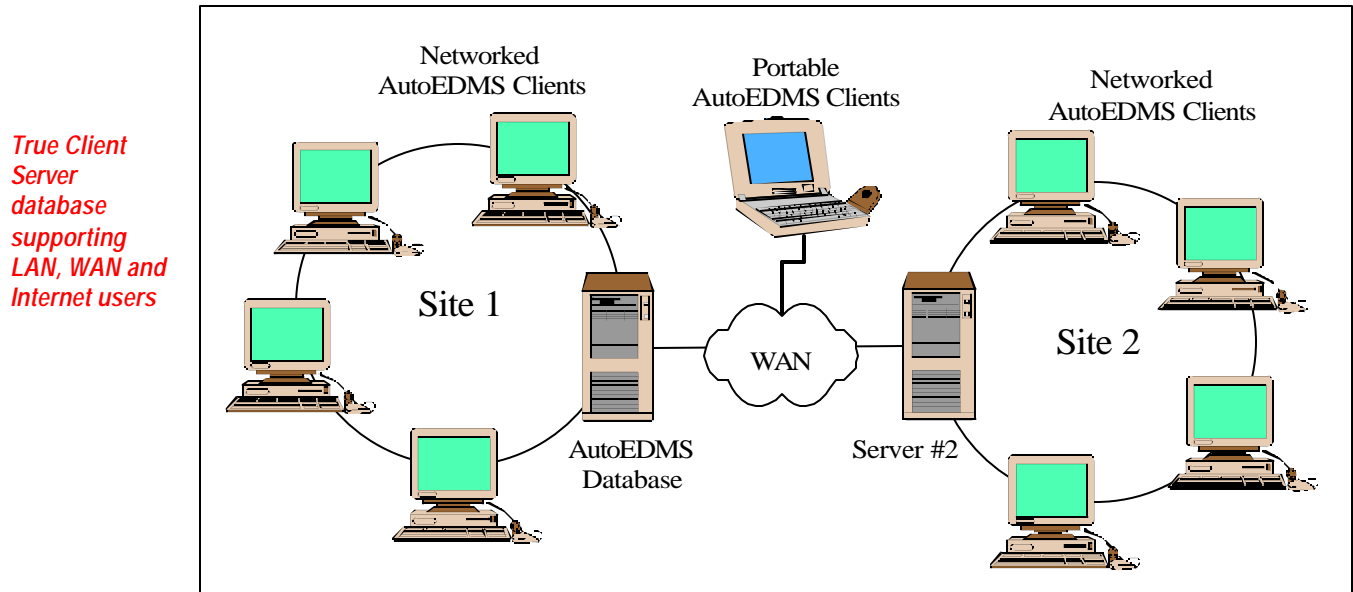
True Client Server database supporting LAN, WAN and Internet users

Figure 1

AutoEDMS supports Windows and Linux server networks with an optional "client/server" database architecture. The AutoEDMS SQL database engine will service both local and WAN-based database queries with a server process, thereby significantly reducing LAN and WAN network traffic (Figure 1). By servicing all database queries at the fileserver, AutoEDMS eliminates LAN and WAN bottlenecks. This client/server architecture is crucial for multi-department and multi-site document control.

Distributed AutoEDMS Application

The AutoEDMS application can be configured with multiple database screens (Forms), with one Form for each local and remote database. This allows a single configuration of AutoEDMS at each location to access both the local document databases and the remote databases, without any reconfiguration of the AutoEDMS application or individual workstation settings (Figure 2).

Concurrent licensing and distributed database support

AutoEDMS can also be installed on stand-alone and portable computers, to access remote document databases across Intranet links.
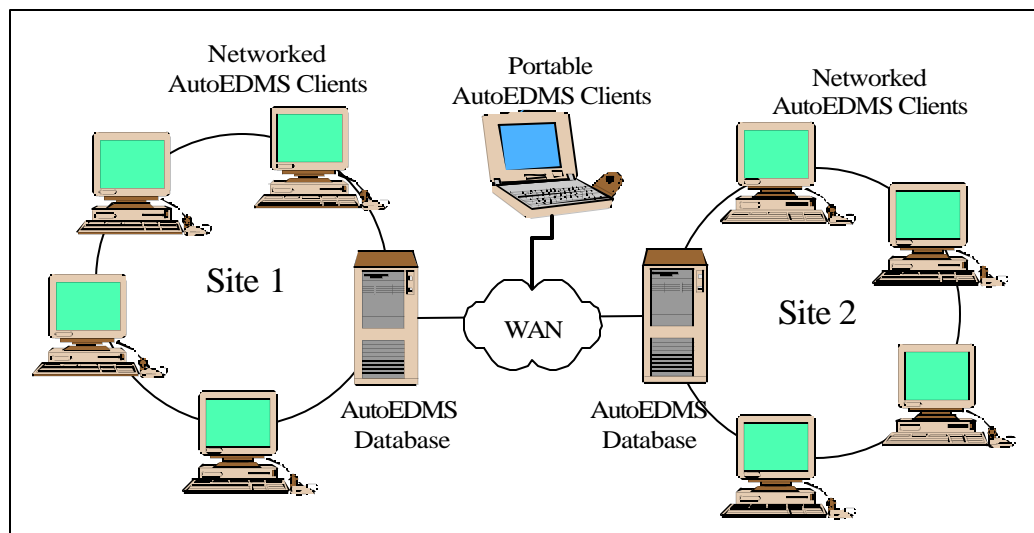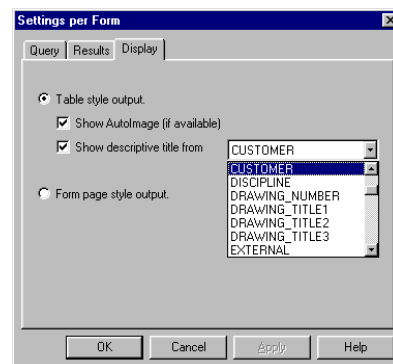
Figure 2: AutoEDMS Clients have concurrent access to both the Local and Remote Databases
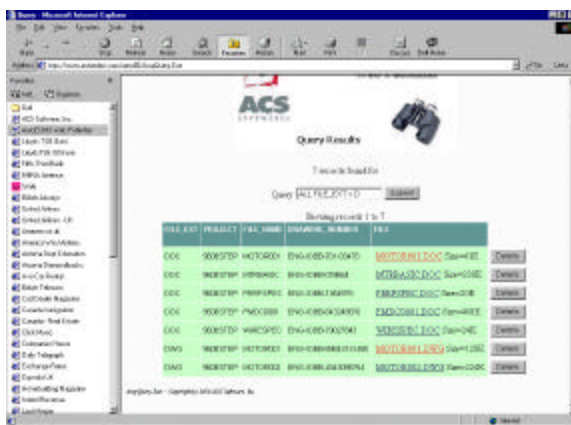
AutoEDMS Web Publisher

AutoEDMS also has a web interface – the *AutoEDMS Web Publisher.* The *AutoEDMS Web Publisher* can be used to provide secure, web-based lookup, view, print and download (Administrator setting) of AutoEDMS-managed files.

Access is via secured login using the standard AutoEDMS 'User Registration' database, however access can also be automated to support 'guest' logins. The *AutoEDMS Web Publisher* will support any AutoEDMS Form and Database and supports any standard Web browser viewer.

Search, view, print and download files from your AutoEDMS database using any standard Web browser

Files can be found by running a search query on the database. The query results show up in a list-view, based upon the selection of fields that the administrator configured. The list view also shows a preview image of the file, based on AutoEDMS' AutoImage JPEG files. The system administrator can determine whether or not files can be downloaded. The results can be configured to show a

"details" button on each record that will show the Form view for that record. As with any standard AutoEDMS Form, you can click on each tab of the Form to see all of the data, etc.

Any number of search routines can be utilized including pre-defined, customized searching or any combination of custom and pre-defined searches. The search results can also include support for the AutoImage 'thumbnail' view created by the AutoEDMS database, thereby allowing users to preview files before downloading. The *AutoEDMS Web Publisher*

also has administrative tools that configure the "time-out value". This determines how long each license is in use before the *AutoEDMS Web Publisher* automatically disconnects them and makes the license available for other users. There's also a bar-chart graph that shows the real-time license usage, etc. for administrative purposes.
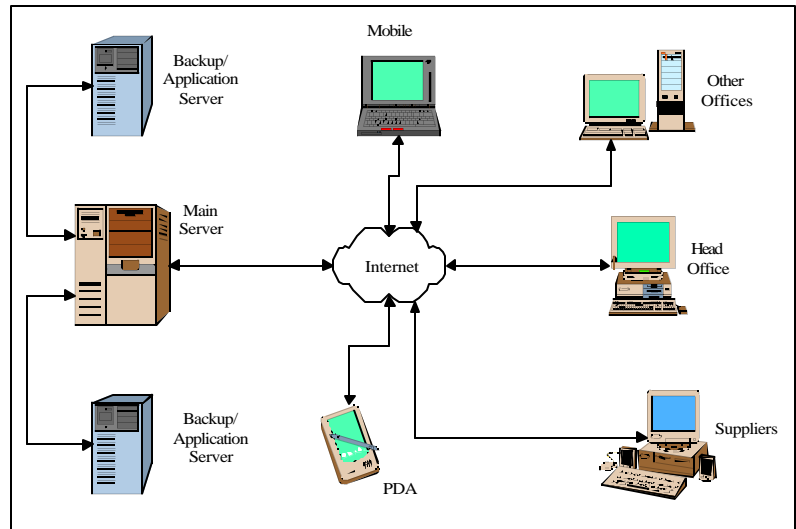
The AutoEDMS Web Publisher supports:

- Searching any AutoEDMS database using any Web browser
- Multiple search routines
- Search results can be displayed anywhere within the web site (web pages are totally customizable)
- Any number of custom table design templates
- File linking as maintained in the AutoEDMS database
- Secured login and 'guest' login
- Any AutoEDMS Form and database
- Setup is 'Wizard' driven
- Windows-based Web servers

AutoEDMS AnyWhere

Server-based computing is an information-distribution model that utilizes economies of scale to improve availability for business-critical applications and reduce the costs of software deployment and maintenance. With server-based computing, applications such as AutoEDMS and its associated data are stored and executed on a central server, rather than on the client's individual PCs. Because data is stored and executed on centralized servers, management burdens are reduced; thanks to single-point management, new software can be deployed in a matter of hours, instead of weeks or months, and scalability, redundancy and security can be strictly maintained. Users receive bandwidth independent performance,

Access AutoEDMS anywhere, anytime using any device

and can access AutoEDMS, anytime from anywhere, using any device - from legacy PCs, to the newest Microsoft Windows-based clients, including Windows-based terminals, thin clients, mobile and wireless devices and information appliances. In addition, server-based computing allows users to display multiple applications simultaneously and provides access to programs running in multiple environments - including Windows, Java and legacy operating systems - all from one graphical desktop.
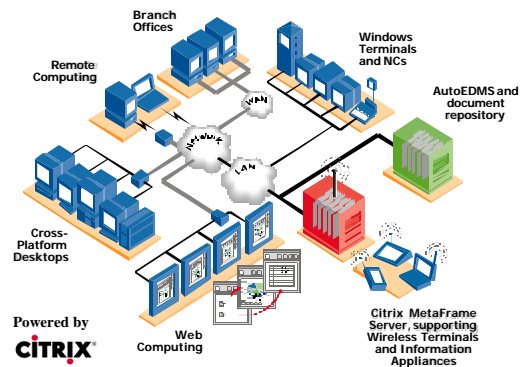
While the applications and data are hosted on secure servers, a simple access program is downloaded onto each client workstation. This desktop icon provides each user with access to

both applications and data stored on the server, depending upon the user's security permissions. This will allow the client to control access to their application programs and data. This user-level system security, coupled with AutoEDMS' security, will control access to the AutoEDMS application and data stored within the Database. This will determine which users' have access to data, Forms, record creation and modification, and view and print facilities within AutoEDMS. Indeed, the client can also allow other users from other departments, sites, or other companies such as sub-contractors access to certain AutoEDMS Forms and data, providing those users have a valid login ID and password.

You can use AutoEDMS over the Internet in conjunction with thin-client servers like Citrix or Windows Terminal Server. Basically, by setting up a thin-client server on a LAN that's running

Deliver the complete AutoEDMS solution over the Internet to any browser-based user in conjunction with thin-client servers

AutoEDMS, the complete AutoEDMS solution can be instantly delivered over the Internet to any browser-based user. The vast majority of Fortune 500 companies use these servers typically to host ERP systems across their enterprises. AutoEDMS AnyWhere is an inexpensive solution to support browser-based users, without the typical HTML/Java/SQL Server support overhead of new Intranet-based solutions. In general, most Windows applications are far more functional and more reliable than comparable Java-based solutions. One of ACS' customers, NAV Canada, has deployed AutoEDMS over Citrix for over a thousand users spread-out across Canada.

Dynamic Drive Mapping

AutoEDMS manages files and file locations without being confused by mismatched drive letter conflicts

AutoEDMS can manage files on multiple servers, on local drives, on optical jukeboxes and across modem connections. It tracks files using its built-in *Dynamic Drive Mapping* (DDM) technology. DDM keeps track of files by their physical "UNC" location (fileserver name/volume name/path and filename), instead of drive letters. This enables each AutoEDMS database to locate the managed files, without being confused by users mismatched drive letters. Drive letter conflicts are a problem on local area networks (one user's Drive G: is another user's Drive M:), and almost unavoidable across wide area network links. Dynamic Drive Mapping avoids drive letter conflicts automatically and simplifies network administration.

Database Reliability

Document management systems are "critical path" solutions — if the document database becomes corrupted or creates fileserver problems then users cannot access their files. Unlike standard desktop applications where one user's problems do not affect anyone else, document management system problems can impact the performance of multiple people, entire departments and multiple sites.

AutoEDMS is a robust and proven document management solution. ACS has used the Pervasive SQL database engine since 1986 because of its reliability and fault tolerance (Figure 3). All database updates are "pre-imaged" to prevent database corruption due to incomplete record updates. AutoEDMS supports the latest Pervasive SQL v11 Server Database Engine.

AutoEDMS uses the Pervasive.SQL database engine because it offers significant advantages over most other database platforms

AutoEDMS uses the Pervasive.SQL database engines because they offer significant advantages over most other database platforms. Most lower-priced EDM systems rely on dBase-style databases, which are inherently slow and unreliable. More expensive EDM systems require a higher-end SQL database such as Oracle, SQL Server, Sybase etc. SQL databases normally require significant database administration, including performance tuning.
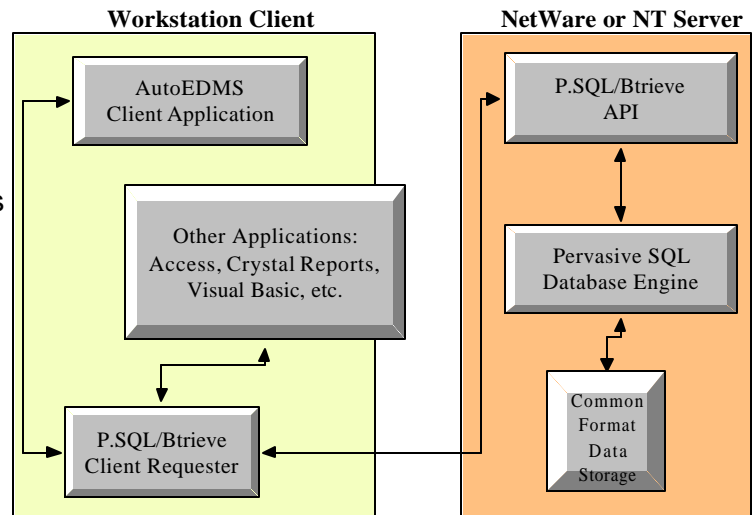

Figure 3

Pervasive.SQL offers all the advantages of these higher priced databases, providing high performance, unmatched reliability, client/server support for LANs, WANs and the Internet – all without requiring *any* database administration or support from the MIS department.

The following is an extract from Pervasive's website:

"If you use a program to store your checks, addresses, or other such information on your PC, or if your company owns an accounting system that runs without a database administrator, you've probably wondered what database does the background work. If the program works reliably day in and day out, chances are your system uses Pervasive.SQL. Pervasive Software has long been a leader in the embedded-database market. Novell's network operating system used earlier versions of the product, called Btrieve, for its own internal database.

Pervasive's latest incarnation offers some enhanced utilities, including the impressive Control Center. Similar to Enterprise Manager in SQL Server or Oracle, the Control Center provides a graphical interface to manage and view a Pervasive installation's various components. In addition, Pervasive claims to have increased performance significantly over previous versions. The company has also improved the Open Database Connectivity (ODBC) interface. Pervasive has attempted to jazz up the learning experience by adding the "Tech in the Box Training," a series of entertaining multimedia lessons that provide a basic introduction to the product.

Pervasive.SQL comes in three flavors: Workstation, Workgroup, and Server. Choose the Workstation version when only the local user will access the data. Some users will probably want the Workgroup edition. Last, users who need a powerful client/server environment can choose the Server edition. Coding for each engine, however, is the same. Therefore, one set of code can support the smallest to the largest installations. Pervasive.SQL not only supports multiple installation sizes, but it also supports a complete line of platforms including Windows and Linux (32 and 64-bit). The various operating systems' database files are all binary-compatible. So, you can move a database file from one operating system to another simply by copying the file.

If you need to deploy a product with a reliable database engine that scales and requires almost no maintenance, take a good look at Pervasive.SQL."

Joseph Lax is a senior consultant with Flash Creative Management, a Hackensack, N.J.-based consulting firm, where he provides technical leadership on database technologies. You can find more of his SQL articles on The Development Exchange's Ask The Pros Web site. Reach him at josephl@flashcreative.com.

Database Performance

The Pervasive.SQL database engines feature full 32 and 64-bit implementations and use a multi-threaded design to improve throughput and lay the groundwork for symmetric multiprocessing (SMP) support. AutoEDMS database reliability design features include:

Manage up to 4 Terabytes of information in one AutoEDMS database

- Transaction processing
- Logging and roll forward
- Data integrity enforcement
- Data caching
- Physical data access

Apart from the optional Pervasive SQL client/server database engine, AutoEDMS does not use or require any other server-based processes. AutoEDMS can be run as a shared network application or as a locally configured application. This allows AutoEDMS to be easily implemented into a variety of network and workstation environments, without risk of failure due to inadequate hardware configurations. This ease of implementation also ensures that the AutoEDMS document databases are always on-line and do not impact fileserver performance or operation.

As discussed previously, ACS recommends that large, multi-server or multi-site networks establish multiple distributed document databases, to provide fast and reliable access for local and remote users. There are no limits to the number of records in each AutoEDMS database, up to the total database size of 4 terabytes. AutoEDMS document databases are dynamically "sized", so the number of managed documents can grow without any changes to the databases. Other document management systems require the databases to be pre-configured for a set number of documents or records.

Database search speed is enhanced through the use of configurable database indexes. AutoEDMS indexes are an integral part of the underlying databases so there is never a problem with indexes getting "out of sync" with the databases. Other database performance design features include:

- Advanced automatic data caching using a hashed search algorithm to improve data access performance and reduce disk I/O.
- Automatic index balancing to minimize search paths.
- Shadow paging to improve access performance and eliminate "dirty reads".
- Continuous operation support that allows the backup of server databases without interrupting application access.

Data records are indexed using the "b-tree" indexing algorithm and indexes may be added or dropped after a file has been created. AutoEDMS database search times are extremely fast, even with multiple-gigabyte databases.

Database Design and User-Friendly Forms

AutoEDMS database designs are *completely* configurable and *multiple* database screens (Forms) can be designed for each database. Each Form can be designed to reflect the needs and abilities of:

Graphical, Form-based interface to your AutoEDMS database

- individual users
- user groups
- types of documents
- departments
- work processes

Figure 4: Example Engineering Form

Forms can have multiple pages, hidden fields, display-only fields, drop-down field value list fields, etc.

Quickly create AutoEDMS Forms for each Department using the built-in QwikForm Form design tool

Figures 4 and 5 illustrate the use of two Form designs sharing the same database information. Both Forms employ a tab style approach. Figure 4 shows a management Form design, as typically used in a drawing office, which includes all the fields in the database, accessible via tab selection, with customized function buttons, and a customized toolbar.

Figure 5 shows the same information, but presented in a slightly different way showing reduced database information

Figure 5 – Shop Floor Form

and a more simplified format. This represents a typical user's Form, as used in other departments or on the shop floor, and has a simplified design with only two information 'tabs'.

In this particular example, this Form is used on the shop floor where the workers use gloves and touch screens. The simplified, customized toolbar buttons on the right-hand side of the Form have been designed to cater to this need, as they are much larger than the buttons in Figure 4 so that they represent a bigger target area.

AutoEDMS Forms and databases are designed using the QwikForm (Page 18) design tool. QwikForm allows the complete design and customization of any AutoEDMS Form, including localization of the User Interface (Form). The AutoEDMS QwikForm tool gives you the ability to flexibly design and customize your AutoEDMS Forms and databases. Use QwikForm to design:
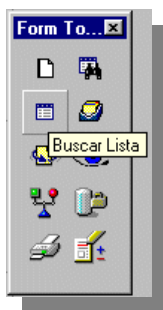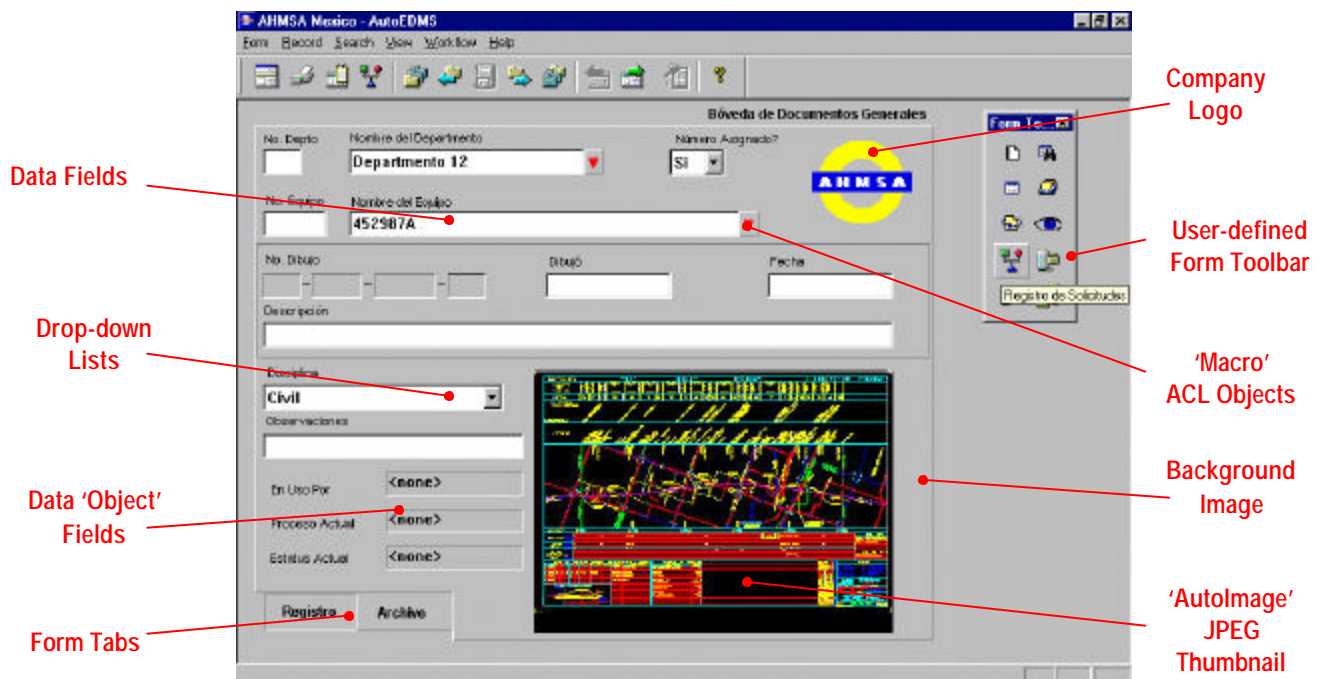
User-defined floating toolbar icons represent document management functions and other applications. Access to these tools is protected through AutoEDMS security.

Multiple Sites

AutoEDMS users can easily access different document databases or sites, by simply selecting a different Form to use. AutoEDMS will automatically attach to the appropriate databases, without any reconfiguration. "Tabs" on the Form, with each tab representing a different site, can link databases and key sites that are frequently accessed. Local and remote AutoEDMS users are simultaneously controlled with file and record locking, through the client/server AutoEDMS databases. Each AutoEDMS database can have up to one hundred and nineteen indexes defined, for quick searching and queries.

Document Database Search Tools

AutoEDMS includes a variety of search tools, based on the type of search required:

- If the user knows the particular document name, they can do a "FastFind" on the name and go to that document immediately. FastFind uses internal database indexes for instant document retrieval.
- If the user is unsure of the spelling or word order within a database field or fields, they can use AutoEDMS' powerful "Fuzzy Search". Fuzzy Search will search through indexed and non-indexed fields (descriptions, part numbers, long filenames, etc.) and find the closest matches, regardless of misspellings, difference in word order, word usage, etc. Fuzzy Search is also an excellent search method for finding a set of documents that might not have been previously categorized with identical field values.

Multiple search routines are provided to allow fast access to your documents

- Experienced database users can use the "Guided" search to build SQL-like search criteria. The Guided search prompts the user with a list of field names, search operators (greater than, less than, etc.), search values and Boolean logic (AND, OR, etc.). This is an excellent multi-field search tool, for multi-field indexed searches.
- System Administrators and experienced users can build and "publish" pre-defined searches, using AutoEDMS' *Custom Search Library* (Figure 6). The Custom
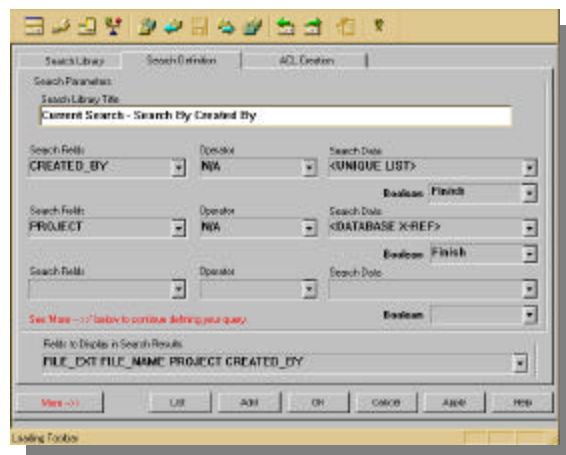
  Search Library is menu-driven and is an easy way to create "saved" searches that

Figure 6

  are used frequently. The Custom Search Library can prompt users for inputs, present a list of unique database values to choose from, use conditional logic, etc. Each saved search can be named with a description and presented as a Toolbar function.
- AutoEDMS databases are ODBC compliant and can be queried by external programs and database utilities, including Microsoft Access, Crystal Reports and Visual Basic.

File Storage, Filenaming and Backup/Restore

Manage existing files in place, by maintaining existing filename conventions and storage locations

One of the key issues that all organizations face is the management and organization of current on-line files. One of AutoEDMS' key strengths is its ability to catalog and manage existing files *in place*, by *existing filename*s. This allows organizations to quickly and easily implement the AutoEDMS document management system, at any and all sites, without changing file storage locations, fileserver hardware, filenaming conventions, etc. Some files and storage locations can remain "as is", while others may need to be modified, based on a companies file management strategies. AutoEDMS gives users the tools and migration paths needed to manage existing files and establish good file storage methods for the future.

Import Routines Recognize Existing Storage Locations

Users can use a customized import routine in AutoEDMS to automatically fill-in database field values, based upon codes used for directory names and filenames. This import process helps users initially start with an intelligent document database that uses existing directory and filenaming standards. The intelligent databases also help users get up-to-speed quickly with their new document management system.

Intelligent Filenaming Provides Secure Backup & Restore

Once the AutoEDMS document management system is on-line, it can automatically name and store new files with intelligent filenames, based upon project names, part numbers, job IDs, etc. These intelligent filenames can be very important for backup and restore procedures, in the event of hardware failure, etc. Since all AutoEDMS controlled files are stored in standard network volumes, all standard backup and restore devices and software can be used, either for full backup/restore or individual file backup/restore.

File Check-in/Check-out

Built in file check-in and check-out procedures

All file access is managed through built-in AutoEDMS file check-in and check-out controls. When a user selects a file or group of files to edit, the document(s) are checked-out to either server-based work areas, or local station work areas. The databases are automatically flagged to show who is working on the files and to prevent simultaneous updates by other users.

While files are checked-out, other users can still view/print/copy the last saved version. Checked-out documents can be reassigned by the system administrator.

AutoEDMS Audit Trails

Complete audit trail information of all workflow processes

All file access automatically creates a comprehensive audit trail. The AutoEDMS audit trail tracks the files, who used them, where they were used, date and time, file activity, etc. AutoEDMS creates the audit trail information in a standard SQL database, so it can easily be used in management reports.
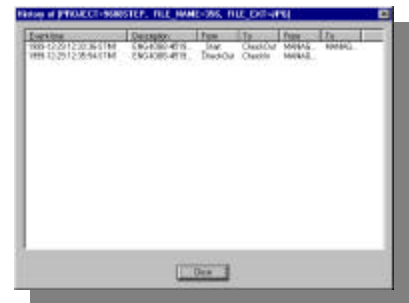
Revision Control and Automatic Archiving

AutoEDMS' revision control is completely configurable, very comprehensive and can be fine-tuned to match each client's requirements. Any number of revisions can be kept on-line for viewing and copying, but only the current revision will be available for editing. Revision control will also manage the situation when one document "replaces" another. Different revision control standards can be implemented for different types of files, controlled vs. uncontrolled files, etc.

Workflow Routing & Workflow Audit Trails

AutoEDMS provides workflow routing of documents; typically through a draft/ check/ approve cycle. In this scenario, AutoEDMS automatically protects files that are in the workflow process and keeps an audit trail of all file activity.

The built-in AutoEDMS Workflow Engine automates the design and administration of workflow processes, and also provides status reporting and audit trails. The Workflow Engine is based upon a graphical workflow designer that is used to design and modify custom workflow processes. By "dragging & dropping" icons that represent the various workflow steps, authorized users can easily build a complete workflow that can be viewed and printed to document the process (Figure 7). Each stage of the Workflow has properties (parameters) that can be set for file routing, user security, etc. With the optional *Advanced Workflow Designer*, custom "ACL" routines can also be added to each step to implement additional workflow functions that may not be addressed by the standard Workflow Engine.
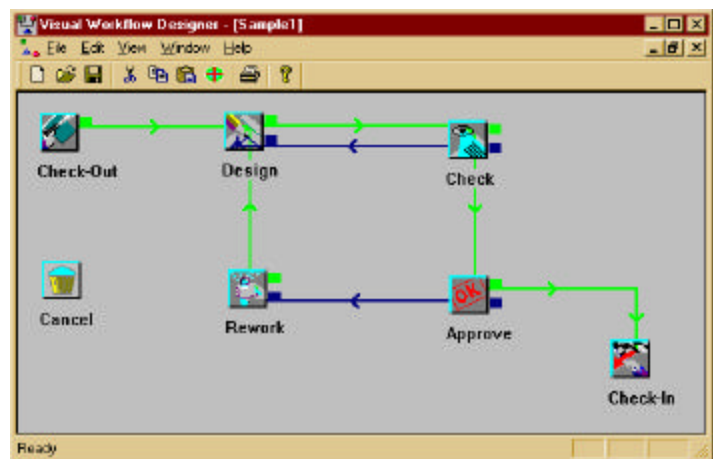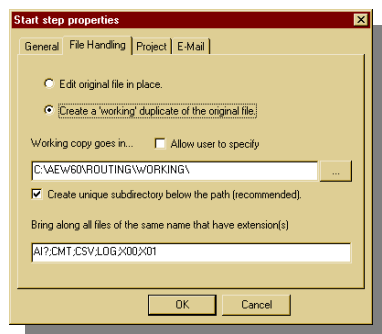

Figure 7

Each workflow route is represented by a "route slip". These route slips are passed from user-to-user, user-to-process, etc. Different route slips can be designed and saved for standard use. Each step along the workflow process has its own unique properties that are user defined using the step properties dialog settings. The graphical workflow designs are also used for real-time status of document activity.

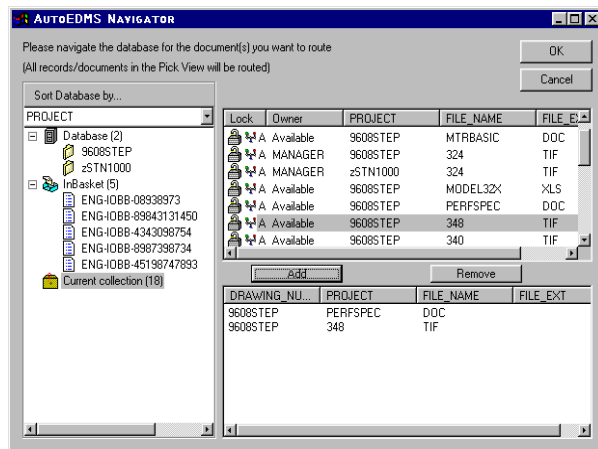*Create your own Workflow templates using the Visual Workflow Designer*

Each document can be highlighted on the graphical workflow, to show where it is in the process. In addition, a complete audit trail report will show authorized administrators the entire life history of the documents and the workflow processes.

The AutoEDMS Workflow Engine helps users gain additional productivity, by documenting and highlighting delays in their workflow processes. The Workflow Engine is based upon an AutoEDMS database (Workflow History) that can be queried and reported on, to document and quantify the time documents spend in their workflow processes.

AutoEDMS Navigator

The AutoEDMS Navigator is used in any situation that requires the user to "navigate" the database for the purpose of building a "collection set" of chosen records/documents. Typical routines are batch check-out/check-in, transmittals, email transmissions, printing, copying and

moving records/documents etc. The Navigator allows AutoEDMS users to select 'collection sets' of records for batch purposes. These 'collection sets' are built from Project Databases, Search routines, and the user's own in-basket. Using an Explorer-like interface, the user can select the files they require (assuming they are available and are not checked-out by anyone else).

Engineering Change Orders, Requests and Notices

Through the AutoEDMS Workflow Engine, customized routes can be designed to process engineering change orders (ECO), requests and notices. The example in Figure 7 illustrates one example of an ECO-related workflow process. Each company processes change orders differently and AutoEDMS can handle any variety of ECO/ECR/ECN methodology.

Use AutoEDMS for standard processes such as ECRs, ECOs and ECNs, …

These processes typically involve four key issues:

- ROUTING - Initial change requests are routed to the appropriate person(s) for review and evaluation. Change Management personnel then route the requested changes to department heads and managers for their input and approval.

- DISTRIBUTION - ECO is routed to appropriate departments and personnel. Affected files are assigned and distributed to drafters, etc.

- APPROVAL - The affected files are routed back to management for approval.

- NOTIFICATION - Management notifies all affected departments, customers, suppliers, etc. with an Engineering Change Notice to relate the completed changes.

The various notices and change orders are typically created with off-the-shelf tools like Microsoft Word, using predefined document templates.
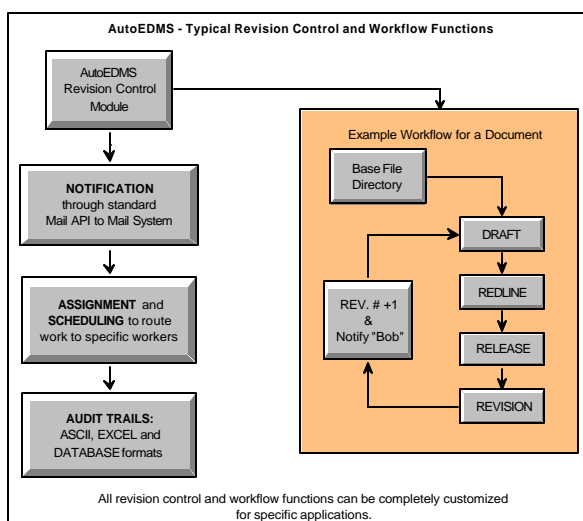
Figure 8

The example in Figure 8 provides an overview of the issues involved in processing ECOs, ECRs and ECNs. AutoEDMS provides a flexible change control management system, to meet in-house requirements and outside agency approvals (ISO 9000, for example).

AutoEDMS manages the creation of the change documents in Word and routes them to the appropriate personnel. In many companies, most changes are small and do not require as much control as big changes. Big changes though, typically require extensive routing, approval and audit trails.

Transmittals

... and Transmittals

AutoEDMS can also be used to manage and create Transmittals. With the AutoEDMS Transmittal System, two databases - one for the drawings/documents, and one for the Transmittals, are created and are linked by a common file ID, normally the drawing/document filename. This way, Transmittals can be searched and all associated documents listed, or a document file can be searched to find the Transmittal Report(s) it's associated with.
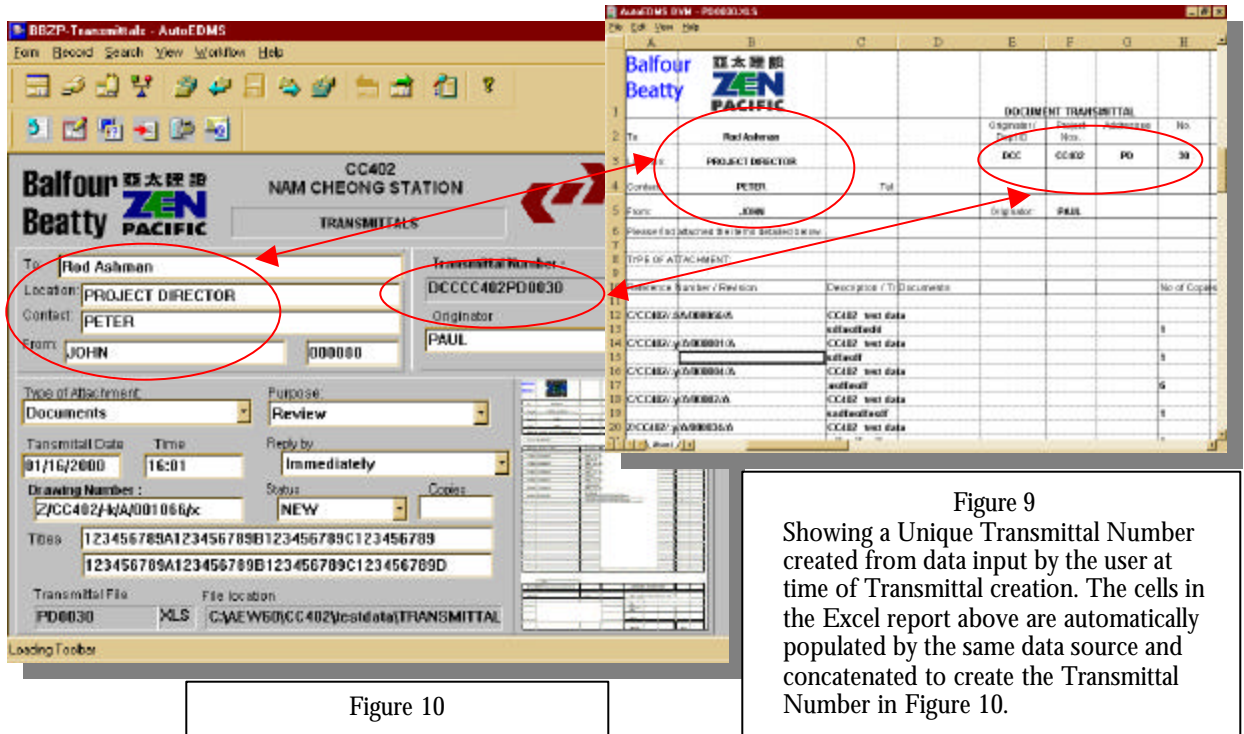

Figure 9
Showing a Unique Transmittal Number created from data input by the user at time of Transmittal creation. The cells in the Excel report above are automatically populated by the same data source and concatenated to create the Transmittal Number in Figure 10.

Figure 10

AutoEDMS uses an Excel template to produce the Transmittal report. As the data is entered into AutoEDMS through user-defined prompts (keyboard or selection list) to populate the database fields, AutoEDMS automatically populates the appropriate cells within the Transmittal report. (Figure 9). Transmittal numbers can be easily created by concatenating data strings to automatically create unique Transmittal Report numbers (Figures 9 & 10).

EMail and Faxes

Supports MAPI and SMTP-based company-wide Email systems

AutoEDMS and the AutoEDMS Workflow Engine support the "MAPI" and SMTP EMail standards. Through this, AutoEDMS and the Workflow Engine communicate with Microsoft Outlook, Outlook Express, Microsoft Exchange, and other MAPI/SMTP-compliant products. AutoEDMS-related messages can pass through company-wide EMail systems, to notify users of file-related issues, even when they are not using AutoEDMS (Figure 8). In addition, AutoEDMS and the Workflow Engine support printing through standard fax systems from the database Form screens.

Reports, Audit Trails & Project Management

AutoEDMS keeps track of all file activities, including workflow processes, with automatic audit trails. These audit trails track the user, user location, file, project, date and time, time spent and file activity (edited, checked, approved). User-defined reports can be easily created with the built-in AutoEDMS Reports program. Reports can include "thumbnail" views of the files.

All AutoEDMS databases are ODBC compliant, and users can also use other reporting tools like Access, Excel, Word, and Crystal Reports to develop custom reports, without doing any database exports or conversions. AutoEDMS data can also be passed to time tracking and project management applications, through database exchange or direct DDE integration.

File Viewing and Annotation

AutoEDMS provides built-in viewing support for over 200 popular file formats

AutoEDMS offers an integrated file viewing module for viewing over 200 different file formats, including AutoCAD, MicroStation, scanned CALS IV and TIFF images, JPEG color photos, Microsoft Office files, PDF etc. All 200+ supported file formats can be viewed and printed by AutoEDMS, without using the native application. Third party viewers can also be easily integrated with AutoEDMS to provide seamless viewing of other file formats.

Redlining, Markup, Annotation and Commenting

Optional floating Redline and Document Compare module

ACS provides the optional *AutoEDMS Redline Module* for the markup and commenting of documents. The Redline Module provides redlining, annotation with sticky notes, and graphical comparison of drawing revisions. Redlining is controlled through AutoEDMS security; to prevent unauthorized users from marking-up protected drawings. Figure 11 shows comments and a sticky-note icon. The toolbar on the left side shows the variety of redline/annotation tools
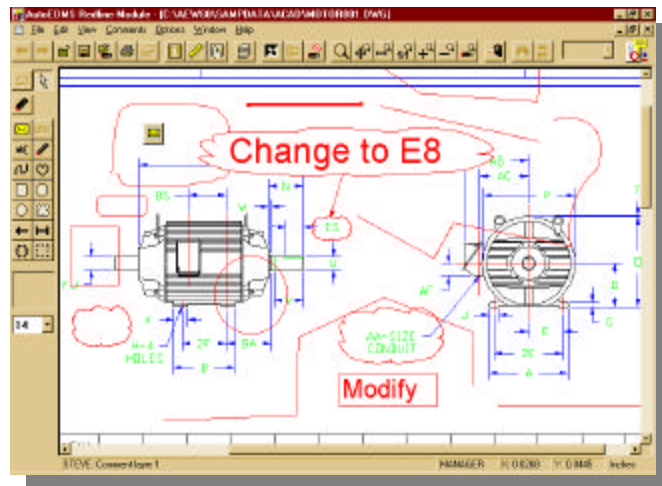
Figure 11

Customization

Off-the-shelf, document management software should meet about 80% of your needs. Every installation has different requirements, and that "last 20%" is often the key to significant increases in efficiency and productivity. AutoEDMS includes a wide array of customization tools that give it the extra flexibility and extensibility to stretch and fill that crucial last 20%. You can customize every AutoEDMS database and Form with the graphical *QwikForm* program. AutoEDMS also includes powerful *Attaché* file management functions, Embedded Linking & Control (ELC) and the ACS Customization Language (ACL).

QwikForm Creates Custom Databases & Forms

AutoEDMS QwikForm is a Windows-based, graphical database and screen-designing program. Forms and databases are created with QwikForm, where database fields are "dragged & dropped" on-screen. AutoEDMS Forms can be designed around colorful JPEG background images, to customize AutoEDMS' entire look & feel. QwikForm makes it easy to design different AutoEDMS databases and screens, for different departments, users and sites (see Page 10).

For specific customization, AutoEDMS includes a host of tools and programs specifically designed to address all EDM requirements
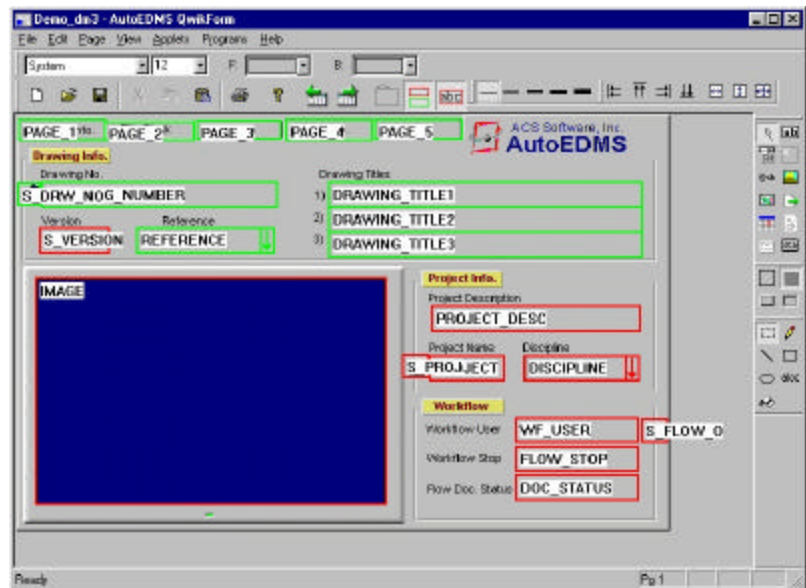
Attaché Functions Automate Document Management

AutoEDMS includes built-in *Attaché* document management functions, including automatic filenaming, EMail links, batch printing, and mass database/file manipulation. These powerful document management functions are easily configured, without any programming. The *Attaché* functions can also be further customized with the built-in ACL customization language.

Application Program Interface

AutoEDMS employs industry standards including; DDE, OLE, MAPI, ODMA etc.

AutoEDMS employs industry standards, including DDE, OLE, MAPI, ODMA, etc., through an API called ACL (ACS Customization Language). The ACL language is a high-level ASCII language, similar to batch commands or BASIC. The ACL language offers well over 250 commands, including full user interface (list boxes, buttons, text input, etc.), file input/output, string and math operators, conditional logic, client/server DDE and more. The AutoEDMS API includes over 60 ACL program libraries and allows system administrators to easily customize AutoEDMS to add functionality and fine-tune the built-in *Attaché* functions. Custom search routines, drawing "sequencing" and links to other databases and applications are good examples of the power of the ACL language. Since the ACL language is ASCII based and non-compiled, it is easy to implement required changes. AutoEDMS does not require the use of low-level "APIs" so experienced "C" programmers are not needed to customize it. More importantly, as new versions of AutoEDMS become available, existing ACL customization is saved, since only the main executable programs are upgraded. The flexible design of AutoEDMS allows each company to customize AutoEDMS to meet their specific document management needs, now and in the future.

Since customization in AutoEDMS is done with the high-level ACL language, the cost of customization is typically 2-3 times less than systems that require 'C' or Visual Basic-level programmers. The ACL language is high-level and interpretive, and significant time is saved over compiled languages that require compilation, linking, testing, and debugging.

Security

Provide protection for your files, programs and database information

AutoEDMS is built around a powerful security system that protects files, programs and database information, based on a system of security clearances. "View-only" users can be given limited access to important files and database information, without the ability to make changes. Security setup is very flexible, with an unlimited number of security clearance groups and levels that can be customized. Each user can be a member of multiple groups, and be assigned the appropriate access privileges. These access control lists protect the AutoEDMS databases, Forms, icons (functions), and files. Based upon a user's security clearance, individual database fields and functions can be hidden from view. User login can be automated through the optional LDAP Integration module (see below). The AutoEDMS security system allows multiple departments and sites to implement security specific to their needs, using existing terms (Drafter, Supervisor, Approver, Admin.). This flexibility is essential for easy security set-up and administration.

ACS offers optional LDAP Integration that provides support for user authentication via the operating system. Once a user logs in to their computer, they can go directly into AutoEDMS and their O/S security groups will be recognized automatically by AutoEDMS.

Integration with Windows Applications

The integration of AutoEDMS with the Microsoft Office Suite and all other Windows programs is through its ODMA support and its exclusive "Embedded Linking and Control" (ELC) technology. Through ODMA and ELC, AutoEDMS can be linked to Windows program file options (File | New, File | Save As, File | Insert, File | Close), to provide automatic file management with minimal user intervention. By linking AutoEDMS to the File menu in Windows programs, users don't need to learn how to access their document management system -- it happens automatically. ELC can also be used to limit users access to options like Delete, Rename, etc.

AutoEDMS has supported AutoCAD for network drawing management since 1986 and provides very tight integration, for management of files, X-refs and blocks. AutoEDMS can provide direct exchange of data with AutoCAD, including AutoCAD titleblock information, through the built-in
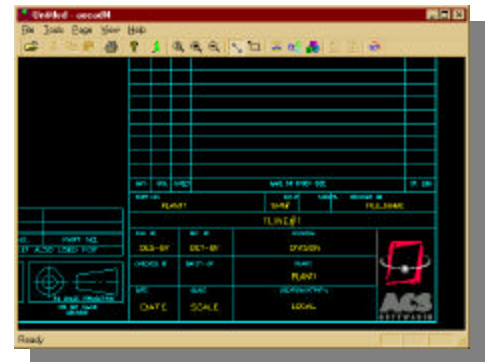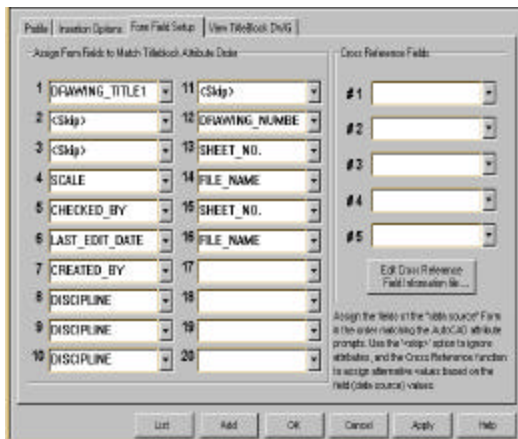

Figure 12

"AutoTitleBlock" function. AutoTitleBlock keeps the AutoEDMS database and AutoCAD titleblock information in sync, through dynamic exchange of database information with AutoCAD attributes (Figure 12). The AutoTitleBlock function can be customized to support custom title block designs.

AutoEDMS also supports complete client/server DDE access with other Windows programs. This allows very tight interaction and exchange of data. Integration with bar-code programs and redline/markup tools are good examples of AutoEDMS' DDE support.

Integration With Other External Applications & Business Systems

AutoEDMS uses an open architecture, such as its "ODBC-compliant" database, so that it can be integrated with other systems using development tools like Visual Basic, 'C', Java, etc. ACS Software also recognizes that if possible, organizations would like to standardize on one EDM system for all their departments and future needs. AutoEDMS may start in the engineering department, but it is just at home in sales, support, services, the print room and other departments.

Integration with ERP/MRP Systems

Through ODBC-compliant drivers, link to other database systems such as SAP, Oracle etc.

AutoEDMS can be integrated with many ERP/MRP systems available on the market, including SAP, MFG/Pro, and JD Edwards. AutoEDMS stores its data in Pervasive SQL, which is ODBC compliant. Clients can use their existing tools like Visual Basic or C++ to link their business systems and AutoEDMS together. For example, if "Drawing Number" is a key field in both systems, a VB or C++ application could link both sets of data together for one display, one report, etc.
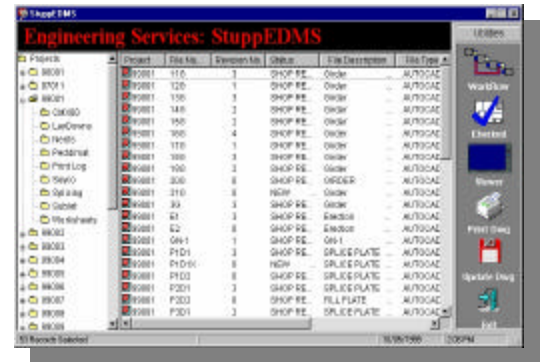

Figure 13

Figure 13 shows an interface developed using Visual Basic, to integrate AutoEDMS and an Oracle database. This interface links CAD drawings and CNC files with the data from both AutoEDMS and MRP system databases. This provides a tool for viewing, printing and tracking shop floor drawings through the many levels of various detailing and production control processes.

Geographic Information Systems

AutoEDMS can be linked to a GIS system that uses a database to store spatial data and related drawing information. AutoEDMS uses a database to track drawings and their related information. AutoEDMS has been successfully integrated with programs such as AutoCAD Map and ESRI, where AutoEDMS provides information about the drawings and the GIS system provides information on components within the drawings. Since the two products do not compete in functionality and can share a common database, integration is logical to provide complimentary functions. The integration is based upon both products using the same database type. Since most GIS programs are capable of using any database through ODBC, they can integrate with the Pervasive.SQL Database Engine used by AutoEDMS. Once a common database is established, an AutoEDMS Form can read and write the data created by the GIS program. AutoEDMS can also provide all the front-end automation in data manipulation by using ACL (ACS Customization Language). The AutoEDMS Web Publisher can also be the "front-end" to a GIS system to provide server-based viewing of the AutoEDMS managed files, based upon GIS selections.

Licensing

AutoEDMS utilizes concurrent floating licenses

AutoEDMS is licensed per *concurrent* user. That is, a user that has AutoEDMS running on their workstation, whether or not they have a database open. AutoEDMS licenses are typically used in two ways:

- Document check-in/check-out control — AutoEDMS is used interactively with various programs for the management of files through check-in/check-out procedures, workflow routing, etc. In this example, each user should have their own license of AutoEDMS, to insure on-line access of the document database and document management functions.

- Document query/view/print — AutoEDMS is used intermittently, for document lookup, viewing and printing. These users often share AutoEDMS licenses since no user needs access to the database full-time.

AutoEDMS is licensed per site (physical location of the AutoEDMS software), for the number of concurrent users required. AutoEDMS includes its own built-in license manager that keeps track of the number of concurrent users. Each AutoEDMS site can manage documents on any number of fileservers and local workstations, as well as remote databases and documents.

Training and Documentation

ACS offers regional technical training for system administrators and developers throughout the year. Training is divided into two levels, System Administration and System Development. AutoEDMS training classes are very hands-on oriented and provide detailed instruction on the installation, customization and technical support of AutoEDMS systems. On-site training for users is available, based upon a customer's specific training requirements.

AutoEDMS includes extensive, indexed on-line help. AutoEDMS documentation is on-line in the new Microsoft HTML Help format. It is indexed and includes tutorials for users, administrators and developers. All AutoEDMS customization is done through the built-in tools and ACL language so there are no low-level APIs or libraries that need to be learned or purchased.

Implementation

Start small with a well-defined project scope

Too often, EDM solutions fail because of over complexity at the initial stage, which only leads to frustration and disappointment for all involved. ACS recommends that anyone considering implementing an EDM system should begin with a 'Quick Start Program', for a limited number of users and a well-defined project scope. Once the system has proven itself, then it can be easily expanded to support additional users and departments. Since each document management system is implemented differently, ACS and our Resellers will work with you in the initial analysis of your system requirements. This allows all parties to develop the best implementation strategy for your AutoEDMS system, based upon your EDM needs, your system requirements, and the capabilities of AutoEDMS.

Implementation Plan Recommendations

ACS recommends an implementation strategy that includes a Project Manager to help coordinate the implementation of the document management system. ACS has found the use of a Project Manager reduces implementation time and improves the overall functionality and quality of the system. ACS and Authorized ACS Resellers should be directly involved in the implementation phases of AutoEDMS document management systems. ACS and Authorized ACS Resellers have the direct expertise necessary in database design, workflow processes, WAN access, host integration and more, to insure a successful implementation. By working together with the Project Manager and your staff, ACS and Authorized ACS Resellers are able to help you get immediate and productive results from your AutoEDMS document management system.

Quick Start Program

The *AutoEDMS Quick Start Program* is the quickest and easiest way to implement the AutoEDMS document management and workflow system in your company. The *AutoEDMS Quick Start Program* includes software, on-site services and follow-up support for a 5 to 20-user, pilot AutoEDMS system all for one low, fixed price. In the span of a week or two, you can have a team of people productively using your *customized* AutoEDMS document management and workflow system. From there, you'll have a platform for your expanded document management system.

The AutoEDMS Quick Start Program includes:

Consider the tried and trusted Quick Start Program approach for a fast and easy method to get your EDM system up and running in less than a week

- Network version of AutoEDMS, providing viewing and printing support for over 200 file formats, including Office files, CAD files, scanned images, Acrobat PDF files and more.

- Network version of the AutoEDMS Workflow Engine (graphical workflow tool that automates the routing and approval of documents).

- AutoEDMS Redline/Compare Tool (floating license).

- On-site, expert consultation, development and training services. Your AutoEDMS representative will analyze your pilot system requirements, develop the specific implementation plan, install AutoEDMS on your network, customize database and workflow models, train your users, import your existing documents and get your initial document management system up and running.

- 12 month All-In-One-Plan (free upgrades during the plan term).

- 10 hours of technical telephone support.

The *AutoEDMS Quick Start Program* is a very affordable, low-risk and quick way to implement a customized, 5 to 20-user document management system, based on your requirements, for a fixed cost. ACS' field-proven, Quick Start methodology will help you lay the foundation for your expanded document management system. It can be quickly implemented for use as a fully working EDMS solution, before rolling it out as a full production EDM system.

Maintenance & Support Services

ACS Software is able to offer our customers a number of software maintenance and support programs, based upon their requirements.

AutoEDMS-All-In-One Plan (Software Maintenance)

Plan ahead for your AutoEDMS upgrades

The AutoEDMS All-In-One Plan is a "subscription-based" software maintenance program that gives you the ability to plan and budget ahead for upgrades to your AutoEDMS system. The All-In-One Plan runs from anniversary date to anniversary date, and provides all software updates, including bug fixes, minor updates, 'dot' releases and major releases during the entire Plan term. The Plans are available for 12-months, 24-months, or 36-months worth of coverage. To qualify for the All-In-One-Plan, your AutoEDMS system must be at the current released level.

AutoEDMS Support Options

AutoEDMS includes extensive on-line help documentation and there is also a web-based 'AutoEDMS Technical Support Knowledgebase' that is continually updated and you can access free of charge on our website. You can also call ACS' technical support hotline and speak to a support representative who will assist you by guiding you through the on-line documentation or the web-based Knowledgebase.

Direct Phone and Direct Desktop-to-Desktop Support
Direct support contracts are also available in blocks of hours for more extensive technical troubleshooting, system design, etc. Support time is deducted in 15-minute increments and this service is available in 10, 20 and 30-hour blocks of support time. ACS Engineers also offer "Live Support" (remote, real-time access to customers system via the Internet) in the process of assisting our customers with their problems and issues.

Consultancy
ACS Software is also able to offer consultancy services for customers who require assistance with setting up or customization of their AutoEDMS systems.

Technical Support WebSite

This is the "gateway" to ACS Technical Support, www.autoedms.com/support.htm, where you will find a website geared towards making it much easier to find the "self-support" and "direct support" options you're looking for. On the website, you will find the following…

Self-support and Direct support options

- **Articlebase** – The "Tech Support Article Search", allows you to search articles, based on real tech support questions and issues.

- **Tech Support Bulletins** – The documents posted here provide detailed instructions or information on issues that will be added to AutoEDMS manuals in the future.

- **AutoEDMS Community Forums** – These forums are used to post questions or issues, as well as to share your knowledge and experience on AutoEDMS and ACL programming with others in the "AutoEDMS Community".

- **Update Notification** – On the "File Updates" page of our WebSite. You can subscribe to our mailing list and receive an email notification as soon as a new AutoEDMS update is available. There will also be a summary of the update process and how to check your installed version of AutoEDMS.

- **"Live Support"** – ACS is very proud to have been one of the first in our industry to offer real-time live support, desktop-to-desktop, over the web. This cutting-edge technology combines desktop screen sharing with direct phone support.

All ACS customers who purchase ACS "Direct Support Options" will benefit from Live Support, which allows our Support Engineers to "see what you see". This support solution has made a world of difference for our customers and our staff.

"LiveSupport is awesome! It makes remote troubleshooting tons easier."

- Jamie Mercer, Systems Engineer, EPIK Communications

"LiveSupport is an invaluable tool to ACS and its clients – it eliminates the confusion that can occur when a client tries to explain to me what they are seeing. Better yet, it provides me with a real hands-on condition without going onsite, which saves our clients real time and money."

> - Keith Bowles, Applications Engineer, ACS Software

System Requirements

AutoEDMS is typically installed on a shared fileserver drive, however, for slow networks, such as a WAN, AutoEDMS can be installed on local hard drives and configured to share files and data from a central fileserver. This option reduces network traffic and improves the performance of the AutoEDMS system.

Operating System Support

AutoEDMS supports all versions of Windows and requires standard hardware support

AutoEDMS Version 6.5 is a 32-bit, MFC-based Windows application and it runs under all flavors of 32 and 64-bit Windows, including Windows XP, Vista and Windows 7.

Workstation Requirements

AutoEDMS requires a minimum of 32 or 64-bit Windows computer, with a minimum of 1GB of memory. Minimal (less than 250 Kbytes) workstation disk space is required since all program modules are stored on a shared fileserver.

Fileserver Requirements

AutoEDMS supports all classes of fileservers and storage devices, and no additional server memory is required for the Pervasive SQL database engine or AutoEDMS. With the SQL Engine, only one server process is added to the fileserver configuration.

Network Requirements

AutoEDMS supports all types of connectivity methods between AutoEDMS sites, as long as workstations have "file service" access to the remote servers (attached as a network user).

AutoEDMS supports Windows, Novell NetWare and Linux network environments

Because the AutoEDMS Pervasive.SQL Database Engine operates client/server under Windows and Linux and WAN traffic is very minimal and successful communication systems can be based on a comm-line speed as low as 56 Kbaud (Figure 14). Batch transmissions of files may require higher speed communications.
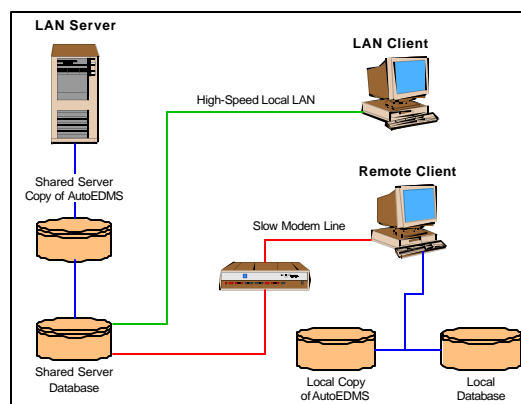

Figure 14

Don't Just Take Our Word For It ...

"Finding a software package to handle the EDMS requirements of your company is the easy part. Identifying the requirements of EDMS for your business is the difficult part of the justification and implementation process. After you have the requirements identified, find a package that will fit your needs without altering your requirements. Then go to training."

Dean Heffentrager
CAD Network Administrator
*Morgan Corporation*
Morgantown, PA

Find a good psychoanalyst

Investigate in Rogaine (before it's too late)

Take advantage of the technical support by ACS. (you're my hero)

Take advantage of the ACS Technical Training Classes, not just for the training, but also to benefit from the experience of the other students.

Create your time estimates for implementation, then double them and add three days before submitting them to management. Keep your initial implementations as simple as possible. Save the bells and whistles for later.

Paul Molnar
Engineering Software Analyst
ERICO, Inc.
Solon, OH

"Plan your system thoroughly. Although AutoEDMS works well right out-of-the-box, a lot of benefits can be realized by customizing the system to the way your company operates. AutoEDMS with the ACL programming language is very powerful and much can be done with it."

Rick Nowakowski
Sr. Systems Designer
Sunds Defibrator
Norcross, GA
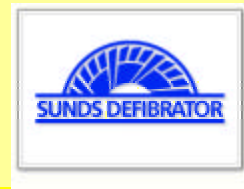
"When we look at something new, for the first time, it appears complex. When we look at it a second time, it appears less complex. When we look at it a third time, it unfolds itself in front of our eyes and reveals its wonderful secrets and capabilities.

Take action. If one idea does not work, try another. AutoEDMS is loaded with functionality and powerful tools to help you develop file management application solutions painlessly. Take advantage of ACS Software's time-proven experience in the document management business synthesized into AutoEDMS.

Evaluate your current situation and get rid of processes and procedures that are a burden or unnecessary and keep those that you know work -- simplify, consolidate, innovate."

James Terrell
Systems/Applications Manager
The KIRLIN Company
Detroit, MI

"Take the time to learn the product. Develop a highly detailed Pilot scope with goals (a big thanks to ACS for their persistence to make us clearly define our scope), and utilize the experience of your software vendor. We were extremely lucky, or should I say fortunate, to find a company like ACS Software that knew their product and could adapt it to our business model. With their help, I can rate our success a solid 10."

Steve Hollingsworth
CAD Systems Manager
Stupp Bridge Company
St Louis, MO

"Although we don't create drawing indexes, CD's or transmittals every day, these are the sort of "return-on-investments" we were looking for when it came time to replace our old data manager. With the AutoEDMS ACL language, we were able to create a drawing index routine. The first designer to use the drawing index routine, worked Saturday solely to create those indexes. We expected the process to take all weekend. Twenty minutes later, as he was leaving, he exclaimed, "Cool, I just did three days worth of work in twenty minutes – I'm outta here!"

Jason Johnson
CADD Systems Administrator
ABB Paint Automation Group
Auburn Hills, MI

"The best advice I can give to others implementing a document management system is: put a major effort into carefully planning and specifying the exact requirements up front. This keeps the customization focused on the overall goal without getting lost in the details. Another important point is to deploy in phases, especially where the work process is complicated, like at NBTel. By doing a pilot, deploying, and then following with sequential phases of customization, the users provide valuable feedback to the developers on how to improve the process. Another important item is to get a good product like AutoEDMS and a dealer with application development experience like CAD/CAM Systems Ltd. There isn't anything that can substitute for experience when it comes to developing a document management system."

Kendal Megarity

Central Office Records Administrator

New Brunswick Telephone Company

Saint John, NB Canada
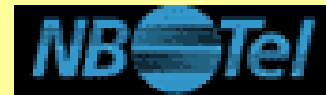
For More Information:

Headquarters
ACS Software, Inc.
P.O. Box 449
Torrance
CA 90508-0449
USA
Ph: 310-755-6040
Fx: 310-755-6050

info@acssoftware.com
http://www.acssoftware.com