

# Document Imaging Systems: key to electronic government in Malaysia

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## Abstract

A "Document Imaging System" may be regarded as a system that captures hardcopy documents, converts the documents to digital image format, and provides electronic storage, search/retrieval, and security facilities. The use of document imaging system technology offer a potential method to increase worker efficiency, reduce the number of employees, improve service, reduce storage space, consolidate or eliminate duplication of work by different government offices. This paper discusses the introduction and historical background on document imaging systems, the development and maturity of ICT in Malaysia as well as Malaysian experience in implementing its document imaging systems known as GOE-EGDMS (Generic Office Environment - Electronic Government Document Management System). Monitored by Malaysian Administration Modernization and Management Planning Unit (MAMPU), this project was one of the seven Electronic Government Flagships which started in 1996. Public organizations have increasingly used information and IT to accomplish day-to-day, operational work activities and to manage the future corporate records. The project will improve both how the government operates internally as well as how it delivers services to the people of Malaysia. It seeks to improve the convenience, accessibility and quality of interactions with citizens and businesses; simultaneously, it will improve information flows and processes within government to improve the speed and quality of policy development, coordination and enforcement.

**Keywords:** document imaging system, electronic image processing system, electronic government, GOE-EGDMS (Generic Office Environment-Electronic Government Document Management System), document management

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## Introduction

People create and print countless letters, memos, reports, spreadsheets, and electronic mail messages. Database management systems and decision support systems spit out reams of paper-based reports. Rather than being freed from paper by our computers, we are being buried by the paper they generate. Some experts feel that document imaging systems provide a vehicle for lightening the burden of paper handling and making it easier to gain efficient use of the information embedded in paper documents. Initially, document imaging systems were viewed as replacements for physical file cabinets. Rather than adding a paper document to a file folder stored in a file cabinet, the document is digitized, indexed to facilitate retrieval, and stored on optical or magnetic media. Storage space required by a

large number of physical records is virtually eliminated. The speed and quality allows simultaneous access to records and files by all offices on the network.

## Background of document imaging systems

The first document imaging system introduced commercially was individual workstation called electronic file cabinet. This machine can be used to scan, index, store and retrieve the document. A Japanese manufacturer, Toshiba Corporation, was first to design and develop a commercially viable business application for optical disk technology (Walter, 1988). Toshiba produced its prototype electronic document storage and retrieval system in 1979 and introduced its TOSFILE system to the marketplace in 1982. Toshiba continued to use TOSFILE in 1992 as an internal computer network to distribute and

archive information and planned to employ satellite telecommunications technology to send information to non-Japan facilities (Matarazzo & Prusak, 1992).

In the United States (US), federal government agencies pioneered the use of optical disk technology for document storage and retrieval. The Library of Congress (LC) launched its Optical Disk Pilot Program in 1982 to evaluate the potential of optical media for improving researchers' access to information (Price, 1985). LC's Pilot Program demonstrated the technical feasibility of using optical disk technology to increase the availability of frequently used materials and to facilitate convenient viewing of rare collections of documents previously inaccessible to researchers. LC planned to expand the system to include a telecommunication system for support of multiple scanners, file servers, and hundreds of workstations and printers (Manns, 1988).

The Patent and Trademark Office integrated imaging technology into its Automated Patent System (APS), initiated in 1982 (Runyan, 1990). The document imaging subsystem, Classified Search and Image Retrieval, is used for the storage and retrieval of full page images of patent documents. Approximately five million US patent documents and 10-15 million foreign patent documents will be incorporated into the imaging subsystem so that patent examiners can search the files of earlier patent documents to determine the patentability of new applications. The entire APS is fully operational in 2002.

The National Archives and Records Administration (NARA) initiated its own research test system, Optical Digital Image Storage System (ODISS), in 1984 (Ranade & Ng, 1989). The documents chosen for the test were Civil War military personnel service records for the Army of Tennessee, approximately 1.5 million page images.

The Internal Revenue Service (IRS) launched its Tax System Redesign in 1984 and implemented a prototype document image management system to determine the feasibility of storing tax returns on optical media ("Federal Information Systems and

Technology Planning," 1989). The imaging subsystem, Files Archival Image Storage and Retrieval System (FAISR), eventually will be used to scan and manage all tax returns. Until questions about the legal admissibility of image-based information in courts of law are resolved, however, IRS will retain the original paper documents after they are converted to the electronic image system.

The introduction of the FileNet Document Image Processing System in 1984 marked the first attempt by a vendor to automate the entire paper handling process, rather than simply the storage and retrieval components addressed in the systems described above (Macadam, 1988). The FileNet system included workflow management software that provided automatic prioritization and distribution of documents in accordance with predefined schedules and routines. The system also gathered statistics on transactions for management review.

In the United States, federal government agencies again pioneered the integration of workflow management software into optical disk-based image processing systems. The Department of Defense (DOD) (1989), for example, established the Computer-aided Acquisition and Logistic Support (CALS) project in 1985 as a bridge to move from the existing paper-intensive weapon system design, manufacture, and support process to a largely automated interchange of technical information. Document imaging technology is important to CALS because DOD must deal with hundreds of millions of engineering drawings acquired in past projects. CALS standards for data interchange, file management, and data access became mandatory for all DOD contracts let after January 1990 (Wiggins, 1990).

Another federal library in the United States, the National Library of Medicine (NLM), also pioneered the use of optical disk-based document imaging systems. NLM developed several prototype systems to investigate the applicability of electronic imaging technology to biomedical document preservation, document storage, and on-line user access to document images (Lesk, 1990). Documents are retrieved through a process that begins with a search of one of NLM's standard bibliographic data bases, MEDLINE or CATLINE.

In contrast with the abundance of publicity about federal government agencies that pioneered business applications of imaging technology, information released by the private sector on its implementations is limited. Although organizations in the private sector are likely to have investigated document imaging technology, they usually have not made their findings public. Companies with successful strategic applications of information technology think carefully about publicity of their achievement, because their competitive advantage can evaporate if a competitor imitates or improves the applications (Strassman, 1990).

A noteworthy exception to publicity on imaging implementations is the United States Automobile Association (USAA) application, where more than 2,000 employees use an International Business Machines (IBM) ImagePlus document image management system to process nearly one million separate sheets of paper each day (Ryan & Booker, 1990). The USAA application is discussed widely in the literature, and USAA established a business partnership with IBM to market the ImagePlus system.

IBM identified the imaging industry as its second greatest growth opportunity, and claimed that in 1990, it earned four times more revenue than any other imaging vendor. In addition to IBM, several other large US computer manufacturers, including Unisys Corporation, Apple Computer, and Digital Equipment Corporation (DEC), made major efforts and investments in the optical disk-based document image processing industry over the past decade (Kaebnick, 1991). The active participation by the large US computer manufacturers imparted legitimacy to the technology and allowed document imaging to gain increasing credibility in both the public and private sectors.

United Services Automobile Association (USAA) was one of the pioneers in the use of document imaging (Wallace, 1992). Other insurance companies, such as ITT Hartford Insurance Group (Wallace, 1992) and Financial Guaranty Insurance Company (Middleton, 1992), have installed document imaging systems to reduce paper handling and stay competitive.

## **Document Imaging**

Document imaging utilizes digital scanners to generate digital representation of a document page. An image scanner divides the page into minute picture areas called pixels and produces an array of binary digit, each representing the brightness of the pixel. The resulting stream of bits is enhance and compresses (to as little as 10 percent of the original volume) by a device called an image controller and is stored on a magnetic or optical medium. Jaginski (2004) defines document imaging as the creation of computer-stored images of document, with three basic capabilities:- (1) a means to scan and import documents, (2) an indexing and search system to organize and find documents and (3) a methods to display documents.

The advent of certain key technologies and the rapid decline in the costs of processing power has helped to justify the cost of implementing document imaging systems. Optical disks, robotics, charge-coupled device (CCD) arrays, high-resolution displays, laser printers, and sophisticated compression algorithms have each played a significant role in making document imaging systems practical for the business environment.

Data flows in traditional information processing systems are centered on four basic activities: capture, processing, storage, and retrieval. While

these same activities are present in a document imaging system, the focus is on document flow and the use of information that is embedded in the document. Documents require special handling, because their value as data is not readily accessible as an electronic image.

## **Development of ICT in Malaysia**

Computers were first introduced in Malaysia in the sixties (Mazni Buyong, 2002). In 1965, the first computer systems used in the public sector was in the national Electricity Board and in 1965 the Inland Revenue Department for processing statistical information. Similar functions were

introduced in the Examination Syndicate, Ministry of Education and the Statistics

Department. As the awareness of computers as a tool for data processing increased, more organizations and institutions began to acquire computers for their record keeping.

In the seventies, the government began to coordinate the usage of computers in most of the ministries. The eighties saw major structural and infra-structural changes taking place. The first public network, MAYPAC, was implemented by Telecom Malaysia.

In 1981, the National Computer Training Center (NCTC) was established in INTAN (National Institute of Public Administration), as a step towards a more effective use of computers. The National Data Processing Committee (JPDN) as the highest authority on computerization in the country. In terms of directions, the Science and Technology Policy were formulated in 1986 followed in 1988 by the Computerization Guideline Manual of MAMPU (Malaysian Administration Modernisation Planning Unit). The establishment of Government databases was also increased during the late 1980s and early 1990s. At the beginning of the 21st century, most of the government agencies have launched their website.

In 1994, the National IT Council (NITC) was formed as a think-tank and advisor to the Government on IT development. This committee chaired by the Prime Minister, and the committee consist of the Deputy PM, relevant Cabinet Ministers, Top Corporate Chiefs, and the Chief Secretary to the Nation as members. In the beginning MIMOS (Malaysian Institute of Micro-Electronic Systems) was responsible for the development of Internet through its JARING (Joint Advanced Research Integrated Networking) network. MIMOS was given the responsibilities to manage and service the Government computer network and facilities, and the proliferation in the use of personal computers (PCs). The spread of computerization is so tremendous that today hardly any Government agencies are without computers.

In the early and middle 1990s, the use of ICT in the Government generally focuses on individual agencies effort in modernizing the administration (including finance, project management,

inventory control, and counter services), education and training, and information provision for public, researchers, and business usage. Multi-media Super Corridor (MSC) was introduced and Electronic Government provides an integrated and holistic look at the national IT while playing a key role to guide the country towards becoming a fully industrialized and developed nation in the next millennium.

### **Multimedia Super Corridor (MSC)**

Malaysia is a nation whose growth has been carefully shaped and guided by strategic five-year development master plans. Providing the ultimate backdrop to these programs is Vision 2020, a national agenda that sets out specific goals and objectives for long term development.

Vision 2020 is an optimistic agenda for Malaysia, but the government still insists to uphold the vision towards achieving the goals. The chief architect of this vision was the Prime Minister himself, Dato' Seri Dr. Mahathir. In brief, the MSC is one of the strategies to achieve the Vision 2020. With Vision 2020, Malaysia has embarked herself on an ambitious plan to leapfrog into this new industry. MSC is the hub for ICT in Malaysia. The need for a clear IT roadmap is also due to the challenge of creating an information literate society that will enhance national socioeconomic planning and development, as stated by the National Vision 2020, and the emergence of the Multimedia Super Corridor and its flagship applications. The flagships applications are: Electronic government, Multi-purpose card, Smart schools, Tele-health, R&D Clusters and E-business.

### **National IT Agenda (NITA)**

A Steering Committee on National Information Technology Policy (DTMN) was formed in 1989 to coordinate the formulation of an IT policy. Not until 1994 when the NITC was formed, that a more serious effort was made towards a policy creation. NITC initiated the process of formulating a national IT plan and identifying key programmes that will contribute to the transformation of Malaysian society into a knowledge-based society. The National IT Agenda (NITA), launched in December 1996 by the National IT Council (NITC), provides the

foundation and framework for the utilization of information and communication technology (ICT) to transform Malaysia into a developed nation in our own mould consistent with Vision 2020.

Chaired by the Prime Minister, the NITC comprises members from the public, private and community-interest sectors and functions as a think tank that advises the government on ICT strategy. MIMOS Berhad, as the Secretariat to the NITC, assists and supports the Council's activities, including the development and realisation of NITA.

The NITA vision is to utilise ICT to transform all of Malaysian society into an information society, then to a knowledge society and finally to a values-based knowledge society. With the theme "Turning Ripples into Tidal Waves", NITA focuses on the development of people, infrastructure and applications to create value, to provide equity and access to all Malaysians, and to qualitatively transform our society into a values-based knowledge society by the year 2020.

The "ripples" are focused initiatives by the government to create the necessary environment and empower the people, so that they will bring about the tidal wave of changes required to achieve the NITA vision. The Multimedia Super Corridor (MSC), the earliest strategic initiative of the NITC, is such a "ripple". Acknowledging the need to involve all Malaysians in the NITA process, another major "ripple" initiated by the NITC is the Demonstrator Application Grant Scheme (DAGS), which encourages Malaysians to participate in and utilize the opportunities made available by ICT. MIMOS Berhad, as Secretariat, manages and administers the DAGS.

As an added aspect of NITA realization, the NITC has formulated the NITC Strategic Agenda - a strategy for Malaysia's migration to the E-World of the new millennium. The strategy involves an orderly transformation from the current governance structure to a more participatory one involving active tripartite partnership between the public, private and community-interest sectors. The Strategic Agenda highlights the need to address five areas critical to our migration to the E-World, namely E-Community, E-Public Services, E-Learning, E-Economy and E-

Sovereignty.

The NITC promotes the notion that knowledge and information will be the most valuable assets in the economy of the new millennium. For Malaysia to be competitive, we must embrace the knowledge-based economy (Mazni Buyong) and create world class Malaysian enterprises that can compete globally with the edge in price, quality, delivery and costs. NITA holds the key to empowering the nation and enabling the emergence of this new breed of entrepreneurs. NITA is the foundation for Malaysia's success in the information age and beyond.

It was only in 1997 that an integrated direction was outlined in the National Information Technology Agenda. The objective of NITA is to shape a Malaysian civil society that uses information, knowledgeable and apply proper value systems. NITA focuses on 3 elements: namely, the development of human, information infrastructure, and applications. NITA is structured in a way that it takes into cognizance applications, MSC, IT programmes, as well as dialogues and feedback mechanisms involving national leaders, Government agencies and the private sector.

However, NITA looks at the macro level of IT direction and guidelines for implementation. At the more operational level, procedures and guidelines in existence since the eighties are still applicable. For Government sector, a Computerization Guideline Manual for management for the public sector has been in use and coordinated by MAMPU since its introduction in 1988. It covers procurement procedures, IT Standards, IT services, security and issues to be addressed in the implementation of IT plans in Government agencies. This guideline supports the Science and Technology Policy, which include computerization as one of its strategy. The National Policy for Library and Information Services is another policy that relates to information management implementation. Another related policy relevant to IT implementation guideline is the National Telecommunications Policy (NTP).

In line with the national policy and vision of placing information and IT as nation's critical

success factors in its effort towards industrialization and growth, the MSC and EG efforts are becoming the focal national initiatives. In the EG project, with MAMPU as its lead agency for implementation, structural set-ups based on committees and task forces at all levels are being operated. Decisions and actions at agencies and operational levels are guided by policies and guidelines based on a number of documents. A Blueprint for Electronic Government Implementation is a document that describes the blueprint and implementation roadmap for EG. It arises out of public and private sector collaboration, which lays out the concepts derived from the EG vision, outlines the waves of EG applications, and defines the dateline for future concept Request for Proposals. The document Towards a Vision for A New Electronic Government in Malaysia explains the vision for EG, explains goals and outlines implementation approaches. The Electronic Government Information Technology Policy and Standards provide an overview of each technology appropriate for EG and states government policy about the specified technologies. It also provides a list of current standards to be considered in designing new systems solutions to ensure coordination and compatibility across all present and future EG applications.

### **Electronic Government in Malaysia**

At present, Malaysia is still lagging behind developed countries -- in 11th place -- according to a survey by the Brookings Institution in the United States (NSTP, 2009). The Electronic Government initiative was launched in 1996, to lead the country into the Information Age. It will improve both how the government operates internally as well as how it delivers services to the people of Malaysia. It seeks to improve the convenience, accessibility and quality of interactions with citizens and businesses; simultaneously, it will improve information flows and processes within government to improve the speed and quality of policy development, coordination and enforcement. The vision of Electronic Government is a vision for government, businesses and citizenry working together for the benefit of Malaysia and all of its citizens. The vision focuses on effectively and efficiently delivering services from the government to the

people of Malaysia, enabling the government to become more responsive to the needs of its citizens.

In the Malaysian context, Electronic Government refers to :

*"A multimedia networked paperless administration linking government agencies within Putrajaya (the new administrative capital of Malaysia) with government centres around the country to facilitate a collaborative government environment and deliver efficient services to businesses and citizens."* (Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), 1998)

The 7 pilot projects of the Electronic Government Flagship Application are as follows and most of the projects were monitored by MAMPU.

1. Project Monitoring System (SPP II)
2. Human Resource Management Information System (HRMIS)
3. Generic Office Environment (GOE)
4. Electronic Procurement (EP) ([www.eperolehan.com.my](http://www.eperolehan.com.my))
5. Electronic Services (E-Services) ([www.eservices.com.my](http://www.eservices.com.my))
6. Electronic Labour Exchange (ELX) ([www.elx.gov.my](http://www.elx.gov.my))
7. E-Syariah ([www.esyariah.gov.my](http://www.esyariah.gov.my))

Malaysian Administrative Modernization and Management Planning Unit  
**(MAMPU)**

MAMPU was established based on a report entitled "Development Administration in Malaysia" by Prof. John D. Montgomery and Milton J. Esman which acknowledged the need to upgrade professionalism for all categories of employees in the Civil Service through educational and training programmes. Based on that same report, a Development Administration Unit (DAU) was set up in 1966 tasked with the responsibility of spearheading reforms in the Government administration. The unit was later expanded and renamed Implementation Co-ordination Development Administration Unit (ICDAU), playing the role of co-ordinator of development projects as well as planning and development of human resources. To cope with the rapid and dynamic development of the Civil Service, ICDAU

was restructured in 1977. With the restructuring, the function of co-ordinating the implementation of central projects was handed over to the Implementation Co-ordination Unit (ICU) while the functions of administrative modernisation and human resources planning were handled by a newly established agency known as the Malaysian Administration Modernisation and Management Planning Unit (MAMPU). In order to support Electronic Government in Malaysia, MAMPU has implemented a document management system called Generic Office Environment-Electronic Government Document Management System (GOE-EGDMS).

### **Generic Office Environment-Electronic Government Document Management System (GOE-EGDMS)**

Rollout GOE Project is one of Electronic Government Pilot Projects under rollout phase and Government agencies. This project is an execution of document management system at Government agencies which is known as Generic Office Environment-Electronic Government Document Management System (GOE-EGDMS) (Malaysian Administrative Modernization and Management Planning Unit (MAMPU), 2007).

GOE-EGDMS is one of the systems in Electronic Government (EG) Flagship Application. The systems have been used by MAMPU (Jun 2002), Prime Minister's Office (January 2003), Ministry of Finance (Mac 2003). It has been develop based on user needs and fulfilling the filing management process flowchart in the government agencies. The systems also were developed based on client-server and web-enabled. GOE-EGDMS systems have 3 main modules :

- (1) Document Management – storing, controlling, searching and accessing the documents.
- (2) Messaging/Communication – easy to send and receive the documents through routing, e-mail and fax.
- (3) Collaboration – improve sharing and disseminating of information through meeting management and job identification.

But the main functions of this systems is to speed up the mail register for incoming mail, document register (incoming mail, outgoing mail, minutes of

meeting, paperwork, circulation etc.), document search through profile and content (text search), sending and receiving the documents through internal e-mail (routing), e-mail and fax, the management of a physical file, meeting management including the appointment of a meeting member and booking of the facilities, sending of the meeting notice and cancellation of meeting through electronic, preparation of minutes of meeting with the identification of action and reaction, preparation of job instruction, action and follow up also the announcement (bulletin board) and discussion forum.

GOE-EGDMS System allows in-house work process at Government agencies to be more efficient and more effective. Related matters are conducted electronically, through paperless operation, based on fast communication. GOE Service includes the following areas:

- Providing demo and briefing on GOE Project and GOE-EGDMS system to the government agencies that plan to use this system.
- Offering advisory service to government agencies that plan to implement GOE system
- Helping and monitoring emerging issues/problems at agency's level and offer suggestions to resolve them
- Reviewing, improvising and validating the implementation system used are stable, and has met the customers' needs.

#### Objectives of GOE:

- Easy to prepare/create and store the documents.
- Fast searching and accessing the documents.
- Ease up and improve the interaction and communication between staff.
- Improve sharing and disseminating of information and documents.
- Reduce the cost of preparing and managing the documents.

The GOE Rollout project was implemented in stages over two years. A total of 14 interested Government agencies participated as pioneer agencies in the application of the electronic document management system. Seven of them applied the system from July 2004, while the rest are in December 2004 with a total of 22 public

agencies and 5055 users (Malaysian Administrative Modernisation and Management Planning Unit (MAMPU), 2008).

Table 1 : List of Malaysian public organization/agency that already implements GOE-EGDMS

No.	Agency	Users
1	Kementerian Pertahanan	471
2	Kementerian Kewangan	384
3	Jabatan Akauntan Negara Malaysia	359
4	Lembaga Kemajuan Ikan Malaysia (LKIM)	459
5	Kementerian Pertanian dan Industri Asas Tani Malaysia	450
	Jabatan Kastam diRaja Malaysia	319
7	Kementerian Perdagangan Dalam Negeri dan Hal Ehwal Pengguna (KPDNHEP)	65
8	Institut Penyelidikan Perhutanan Malaysia (FRIM)	330
9	Lembaga Kemajuan Pertanian Muda (MADA)	391
10	Unit Pemodenan Tadbiran dan Perancangan Pengurusan Malaysia (MAMPU), Putrajaya	370
11	Pejabat Setiausaha Kerajaan Negeri Melaka	219
12	Jabatan Meteorologi Malaysia (Kajicuaca)	200
13	Kementerian Pelancongan	188
14	Kementerian Perusahaan Perladangan & Komoditi	183
15	Bahagian Pengurusan Perkhidmatan dan Sumber Manusia (BPPSM), Jabatan Perdana Menteri	227
16	Jabatan Arkib Negara	160
17	Pejabat Ketua Setiausaha Negara (Pej. KSN)	11
18	Jabatan Kebajikan Masyarakat Malaysia	87
19	Jabatan Perpaduan Negara & Integrasi Nasional	80
20	Institut Penyelidikan Hidraulik Kebangsaan Malaysia (NAHRIM)	57
21	MAMPU Cawangan Sarawak	25
22	MAMPU Cawangan Sabah	20
	TOTAL	5055

To ensure the success of the project, MAMPU appointed Sapura Advanced System Sdn. Bhd, to jointly implement the project. In the rollout of the GOE, the implementing agency has the responsibility to provide allocations for:

- upgrade the existing personal computers or acquire new ones;
- if necessary, upgrade the existing internal security elements;
- ensure that the network has no problems and if necessary, upgrade it;
- provide training facilities like accommodation, food and drinks and ICT equipment;
- upgrade internal ICT security aspect

MAMPU, on its part, is responsible for the followings:

- to provide assessment service, training and pre-implementation service
- to provide equipment
- to provide software system (Microsoft Licensee)
- to provide software application (Licensee GOE- EGDMS for every user)
- to provide for other costs such as training manual and management changes



- to provide for out of pocket expenses (additional 10 % from the total administration cost for agencies outside Klang Valley)
- to provide for maintaining equipment and software Generic Office Environment (GOE)
- is responsible for managing and coordinating the implementation of Rollout GOE Project.

### Conclusion

The use of document imaging system technology presents a potential method to increase worker efficiency, reduce the number of employees, improve service, reduce storage space, consolidate or eliminate duplication of work by different government offices but the e-government implementation is not an easy process. This project is rather a very long and complex process in which the whole government needs to change the way it is doing the day-to-day activities, and as a result, all government's activities need to be reengineered accordingly. Since the implementation is a long term process, the Malaysian government needs to periodically conduct evaluations on its work processes and the current technical and organizational status in order to achieve all its goals and objectives. Thus, the Malaysian government will achieve its vision that is to effectively and efficiently delivering services from the government to the people of Malaysia, enabling the government to become more responsive to the needs of its citizens.

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