

Martinair Holland Schiphol Airport, The Netherlands

European Excellence Award: Imaging, Silver

Executive Summary

At Martinair, the second largest airline in the Netherlands, with over 2000 employees, the Revenue and Cost Accounting department processes coupons for accounting purposes and for billing tour operators and other airlines. The average number of coupons processed per year runs to about one million. The Martinair Input System (MAIS) is used within this department to replace the cumbersome and expensive process of manual data entry and the laborious archive process. With the MAIS system Martinair has realized significant process improvement and cost reductions, resulting in a return on investment (ROI) of less than 18 months.

The MAIS system combines Olivetti software for scanning, OCR, repair, data-entry and process management with an ImageTrac high speed color scanner (IBML) and FileNet storage and retrieval software. The MAIS system has been implemented by Olivetti in conjunction with the Martinair end-users and ICE project management. The pragmatic user-centric approach resulted in a production ready system within four months.

For other Martinair departments and processes, the MAIS system provides a solid and easy method to expand IT architecture for present and future developments in the area of imaging and workflow management. The extensive interest of other airlines and related companies is proving that Martinair, with the implementation of the MAIS system, is ahead of a lot of the competition.

The Challenge

Prior to implementing MAIS, a pool of data entry typists would key in the relevant data from the coupons. An arduous and monotonous task, leading to errors and resulting in highly demotivated employees. The department faced a 2-3 month backlog and a laborious archive process. The usage of temporarily staff was costly and inefficient. Whenever a customer called with a query, it sometimes took up to twenty minutes to retrieve the coupon.

Today, the MAIS system has reduced coupon backlog during peak periods to two days and provides instant access to stored coupons for answering customer queries while increasing archive retrievals to nearly 100 percent. MAIS resulted in highly improved quality and dramatic cost reduction. The total return on investment (ROI) was less than 18 months for the Revenue Accounting Department alone. For other Martinair departments

the MAIS system has paved the way to use the FileNet imaging (& workflow) technology for further process improvement and cost reduction.

Olivetti, the system integrator, realized the MAIS system at Martinair in direct cooperation with the end-user department. This user-centric approach was one of the key elements during the implementation and is reflected by the fact that MAIS is operational in the middle of the Revenue Accounting Department. The Olivetti software for scanning, OCR, repair and process management (together called Document Input System—DIPS) works in conjunction with an ImageTrac scanner from IBML and FileNet software for Storage and Retrieval. The usage of color images endorses the highly innovative concept of MAIS.

MAIS- Functional overview

The MAISsystem scans airline documents (IATA tickets), extracting airline codes, form and serial numbers and check digit. The scanned documents (JPEG format) are stored on optical disks with index fields based on the extracted previous data of the airline documents. The index fields at the moment are:

- flight date
- flight number
- airline code
- form and serial number
- document-id
- aircraft registration (1/1/97)
- from—to (1/1/97)

From a functional perspective, the MAISsystem replaces the old manual process with seven distinctive working steps. The usage of imaging technology almost implicitly also improved the workflow within the Revenue Accounting department. Working with the MAIS system consists of:

- Defining the Airline Flight to be processed by the system by flight number, flight date, aircraft registration, from—to and coupon count (which is done at the gate). With special separators the flight is split in economy class, star class, interline and post flight coupons. By defining the flight via the management station, this flight is now allocated and the system keeps track of this flight throughout the further process within MAIS
- Then the flight is scanned as a batch and counted. This count is compared with the coupon-count which was entered at the define flight (batch) stage. If there is a discrepancy the flight is re-scanned and the coupon-count is re-evaluated and if needed, adjusted. This coupon count is one of the various checks performed by the system to ensure

that only correct coupon data and coupon images are used as input for the system.

- After scanning all coupons run through an off-line OCR process where the airline code, the form and serial number and the check digit are extracted. Due to color sensing and form-fix technology, only a very small percentage of coupons need to be completed on a special repair workstation.
- From the Oracle index database a corresponding data set is built for exporting to the IMPALA system (the KLM owned revenue accounting system that also operates as a host for Martinair. Prior to exporting, some special type documents (\pm 10 percent) need additional data. These documents are automatically presented as an image on a PC workstation for this additional data entry.
- After export to and acceptance from IMPALA, all indexes and images are committed from the file server that was in control during the whole process, to the FileNet system (server and jukebox) for permanent storage on optical disks. The FileNet software allows the users at the Revenue Accounting Department easy access to and the electronic retrieval of the flight coupons and data for the remaining activities.

The MAISsystem is primarily based on the possibilities offered by the high speed ImageTrac scanner of IBML with its open, easy accessible, flat-bed conveyor for document transport allowing easy correction in case of paper transport problems (staples, torn sides etc.). The ImageTrac scanner is fully software parameter driven, allowing Martinair to process different types and formats of documents in the same batch. By producing JPEG color output the scanner not only contributed to the quality of the process but also to the end-user acceptance. With this high speed color scanning capacity (the scanner can run up to 3 airline coupons per second) the backlog has been eliminated during the first months of production. During the summer of 1996 the system handled the full peak load in 4-5 hours a day.

The first phase users, in production since January 1996, are all working in the Martinair Passage Revenue Accounting Department. The total investment for MAIS therefore needed to be fully cost-justified by this department alone. After using MAIS for more then a year now, Martinair experiences benefits that exceed the original calculation.

The benefits of electronic storage and retrieval for related departments within Martinair are already proven and can be realized with a minimal investment. Therefore, in the following phase (1997) other departments will also get access to the MAIS system. Since the system does not need to be operational all day for the processing of coupons, Martinair is now in the process of investigating the usage of the MAIS system and components for

other documents like Invoices, Airwaybills and personnel files. A third future development will be the scanning of flight-related documents and the logical foldering of those documents with certain coupons.

The key motivations for MAIS

Speed and efficiency improvement

Before the introduction of the MAIS system all data of the flight coupon had to be keyed into the IMPALA system. This was not only human and time consuming, it also carries the risk of all kind of data-entry errors. The OCR technology combined with several validations (like check digit) improved processing speed and quality.

Implementing MAIS reduced the backlog of processing flight coupons in flight envelopes of the summer season peak from 2-3 months down to 2 days. Following the reduction of the backlog, previous invoicing of tour-operators and other airlines (if applicable) was handled. An average gain of about six weeks is realized.

Reduction of human labor

The introduction of the MAIS system has resulted in a 50 percent reduction in staff. There is no longer a need for temporary labor during peaks which also reduces the need for training and extra supervision.

Reduction of archiving space

Before implementing MAIS all flight envelopes with flight coupons were archived physically. Now the archiving of 15,000 flight coupons (some 80 flight envelopes) together with the relevant index-data takes only one 5.25 inch optical disk. With the optical disk stored in a Optical Storage and Retrieval Unit (OSAR/Jukebox) model HP 120 T (88 slots) MAIS offers an on-line capacity of 1 year of flight coupons.

Retrieval of documents

With the FileNet component of the MAIS system, flight coupons can be retrieved within 10 seconds and the actual hit ratio of retrieving a coupon is nearly 100 percent. With the old physical "actual archive" close to the Revenue Accounting department, retrieving a flight coupon took approximately 15 to 20 minutes.

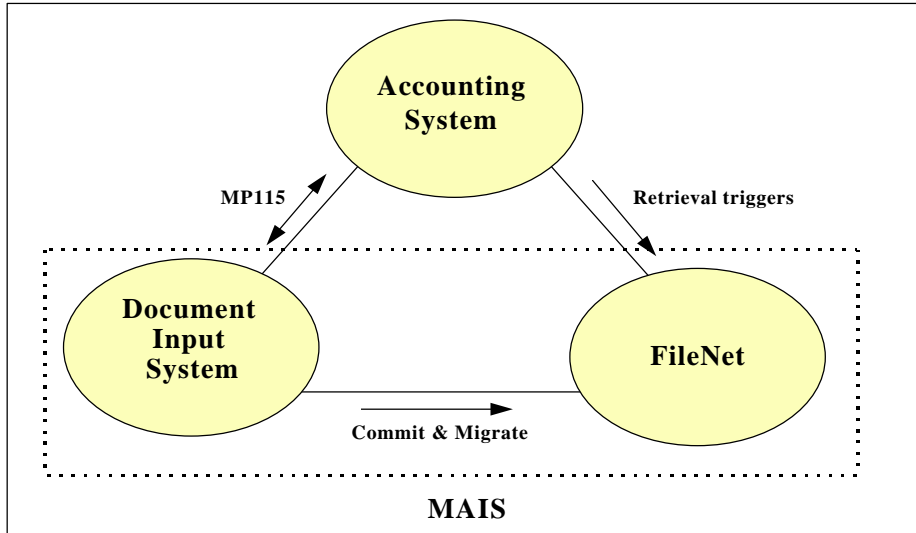
In the old situation every two months the flight envelopes in the physical archive had to move due to the lack of space in the "actual archive". After moving the archive several times it even became harder to retrieve documents.

MAIS—Configuration overview

The diagrams underneath provide an overview of the MAIS configuration. In the high level overview the three main components of the system

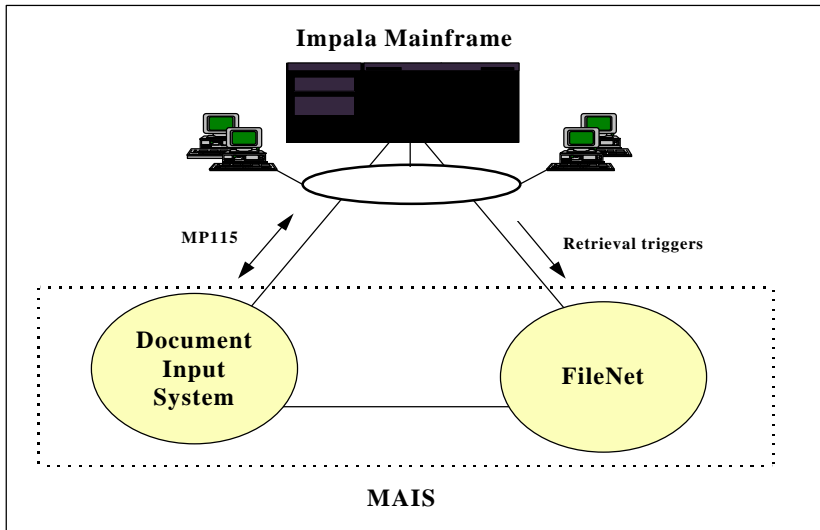
are presented. Each component will be worked out in more detail separately.

High level overview MAIS



MAIS overview—the Accounting System:

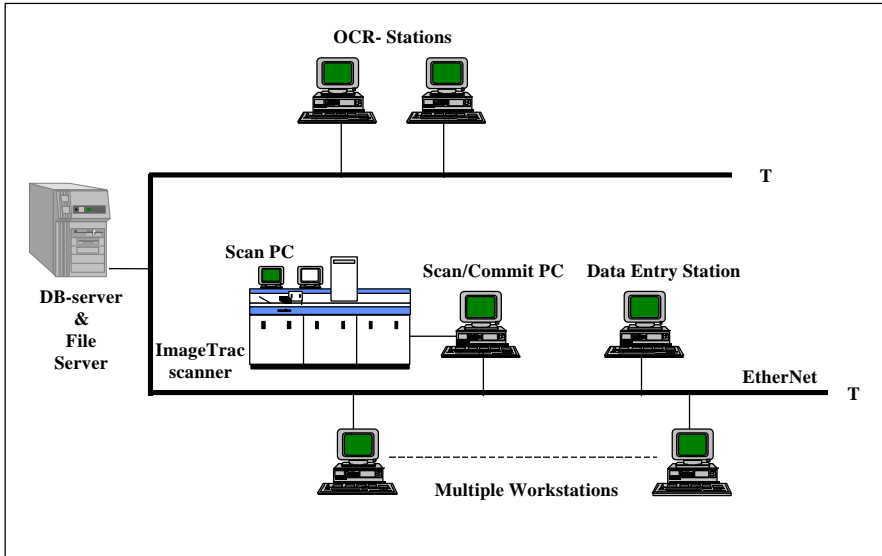
The accounting system IMPALA is not really part of the MAIS system. The MAIS system creates a dataset that is exported to the IMPALA mainframe. The IMPALA application is a core application that is integrated in the Martinair financial system. The IMPALA system is used for validation. Correct processing of the exported dataset by IMPALA is acknowledged to the MAIS system and used for archiving purposes.



MAIS overview—the Document Input System:

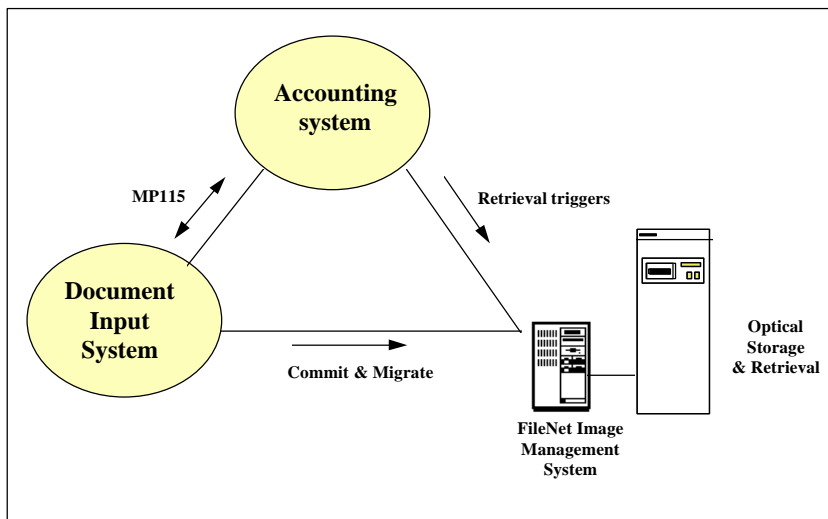
The DIPS configuration contains several software modules concentrated around the high speed ImageTrac scanner. A more detailed overview is presented in the picture below. All workstations within the DIPS environment are connected via a separate Ethernet segment. This segment is separated from the Martinair network for performance reasons. The central database and file server (Oracle) controls the DIPS process. Via SQL statements this database is also triggered for management information output. After acknowledgment of IMPALA all Images and data are committed and migrated to the FileNet environment for actual storage. The DIPS environment supports the following processes:

- Define batch
- Batch (one flight) entry of coupons (scanning)
- OCR and Repair
- Batch management and control
- Additional data entry for special documents
- Committal and migration to FileNet
- Create export file



MAISOversview—the FileNet system:

The FileNet part of MAIS is used for the support of Storage and Retrieval of coupons and related data (indexes). Central in the FileNet system is the Image Management Server (IMS). Within the client/server-based concept of the FileNet software, the IMS supports access and retrievals on all workstations that are connected to the IMS. FileNet uses an Oracle database. Part of the IMS is the OSAR service that manages the actual storage of the colored images (and related indexes) to optical disk. The optical disks are stored in a HP model 120T OSAR (jukebox)



MAIS- Hardware & Software overview

The following hardware and software is located in the Revenue Accounting department of Martinair at Schiphol airport (one location). The whole configuration is installed and operates in full swing since January 1996 after a relative short development and implementation phase of 4 months.

The decision to build the system was taken after a feasibility study in July 1995 and after visiting both IBML in Alabama and an existing FileNet customer in the airline industry. The MAIS project itself started in September 1995 and was operational in January 1996.

MAIS Hardware

Scanner	IBML ImageTrac scanner (including basic unit, autofeed unit, front JPEG image camera and single pocket stacker)
File—Database Server	Olivetti SNX 140, 64 Mb, 2x2.1 GB HDU, SCSI interface
IMS server	FileNet 6250 Base server, 32 Mb, 2x2.1 GB HDU, SCSI interface
Storage device	HP 120 T, 88 slots, 2x 5.25" disk drive
Scanstation	Olivetti M4-90 Pentium
Scan/Commit workstation	Olivetti M4-90 Pentium
OCR workstations	Olivetti M4-90 Pentium
Repair workstation	Olivetti M4-90 Pentium
Data entry workstation	Olivetti M4-90 Pentium
Retrieval Workstation	Olivetti M4-90 Pentium
Printer	HP Laserjet 4P

MAIS Software

Scanner	ImageTrac API
File—Database Server	Novell Netware / Oracle Workgroup
IMS server	AIX / FileNet IMS / Oracle
Storage device	FileNet SW driver
Workstations	<ul style="list-style-type: none"> • Oracle Workgroup clients • Olivetti software for Scan, OCR, Repair, Commit and Data-entry • FileNet Image display for Win-

	dows & FileNet WAL for windows
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MAIS—Implementation

The project organization.

The MAIS project had a normal project management structure. On behalf of Martinair, Implementation Consultancy Europe (ICE) operated as project management. The Martinair (ICE) project manager worked with the Olivetti project team. The project team consisted of Martinair project management and the manager of the Revenue Accounting department, the Olivetti AE and technical consultant(s). The project itself had a very user-centric approach and low involvement of the EDP department. Due to this approach Olivetti was triggered for a turnkey realization and implementation of the system.

Development methodology

Based on a very pragmatic approach both Martinair and Olivetti agreed with the Rapid Application Development method (RAD) using prototypes for the different modules in the DIPS environment. The user-centric approach resulted in high involvement of the Revenue Accounting Department and easy acceptance of the end-users.

Due to the RAD method, the Martinair end-users could easily adapt to the changes that the imaging technology had on their daily work. The benefits became clear and the users were anxious to go live with the system.

Implementation

System installation, system testing and prototyping on the final production location, allowed high user-involvement and direct testing. At a certain date all documents were scanned, after testing thoroughly the whole system. The absence of errors in the parallel production phase reduced this period to less than a month.

The Martinair staff was trained by Olivetti consultants to work with the DIPS and FileNet components of the MAIS system.

MAIS—Future developments

- Within the current MAIS configuration a Rumba interfacing and 3270 emulation on the retrieval station is in progress. This interface will replace the current tape interface with Impala.
- More retrieval stations for the usage in other departments (like legal and claim processing) are part of a further implementation schedule during 1997.

- For the Revenue accounting department a feasibility study has been executed for the processing of non IATA tickets (charter tickets) based on forms and logo recognition. This addition to the MAIS functionality is expected to be operational during the summer of 1997.
- Outside the Revenue Accounting department other departments are interested to use the MAIS system for their documents (claim processing, invoices and cargo documents). A test with the scanning of invoices will start 1st quarter of 1997. The addition of cargo documents (airwaybills) is planned for the 2nd quarter of 1997.
- Another future development might be the usage of OCR/ICR technology to extract more data from the IATA tickets. This additional data can be used as input for management and marketing information.

MAIS—The impact on Martinair

As stated before, the ROI of the complete system including project costs will be within two years, based upon processing of IATA tickets (the current application). This ROI is due to the reduction of staff, less physical archive handling, space reduction and interest effects of early invoicing and related early collection of funds. If airway bills (cargo) are processed (2nd quarter 1997) even the ROI is estimated to come down to approximately 14 months.

The backlog is reduced to practically zero. Therefore the organization can be provided with accurate and actual load figures. This means a tremendous improvement in the quality of management information. Retrieval time has decreased enormously and the hit-rate has increased to nearly 100 percent. Besides these tangible improvements, there are several quality-related improvements.

In the former manual situation the whole process ended with the recording of the flight coupons. With the MAIS system all flight coupons are recorded at nearly the start of the process. As a result of this change of workflow there is a reduction of “document logistics” and “no-hit” situations.

Probably the best proof of the impact and benefits of the MAIS system on the Martinair organization is in the interest of other airlines and even companies outside the industry. During 1996 Martinair hosted several visits of other airlines.