

Airport Management System Release 3.0

Introduction

The aviation industry has matured. The days when flying was only for a few daring pioneers, and later on for a privileged elite, are now far behind us. Indeed, flying has become a medium of mass transportation. The tremendous growth the aviation industry has experienced in recent years has resulted in more and bigger airports, but now it is time to map out strategies for the next generation. Among other things, this will involve enabling airports to handle large aircraft, creating so-called “hub” airports, and finding ways to boost the efficiency of airports by exploiting the potential of modern infrastructure and computer technology.

From a historical perspective, the airport system environment has traversed 4 major development phases:

- ❑ In the 1st phase, attention focused on technical and safety aspects, like air traffic control systems. In many places this is still the case.
- ❑ Phase 2 witnessed automation of departmental functions - like systems for financial management and maintenance department.
- ❑ The 3rd phase was characterized by emphasis on customer support. It ushered in flight information systems and enhanced ramp handling systems, to cite two examples.
- ❑ In the 4th phase, the challenge now facing the industry is how to integrate most of these systems while implementing others to support airports' service functions and furnish realtime information for commercially profitable management of them.

In the fiercely competitive environment that will shape the years ahead, customers will be the focus of any successful airport. Increasingly, airports will have to achieve a high degree of customer satisfaction in order to gain a competitive edge.

Issues and Challenges

According to ACI, the principal challenges that airports must cope with today are constant growth, large-capacity airplanes, environmental and political constraints, technological changes, and the ongoing repositioning of air traffic as a mass transportation mode.

This fast-paced business environment will indeed alter the way this business is managed. Airports are no longer a merely a necessary resource for airlines; now they are mature businesses in their own right, which have to be run profitably.

It is also becoming clear that, in order to turn a profit, airports need more than the fees charged to airlines. They must also exploit commercial opportunities while making sure to work cost-effectively and providing efficiently managed services.

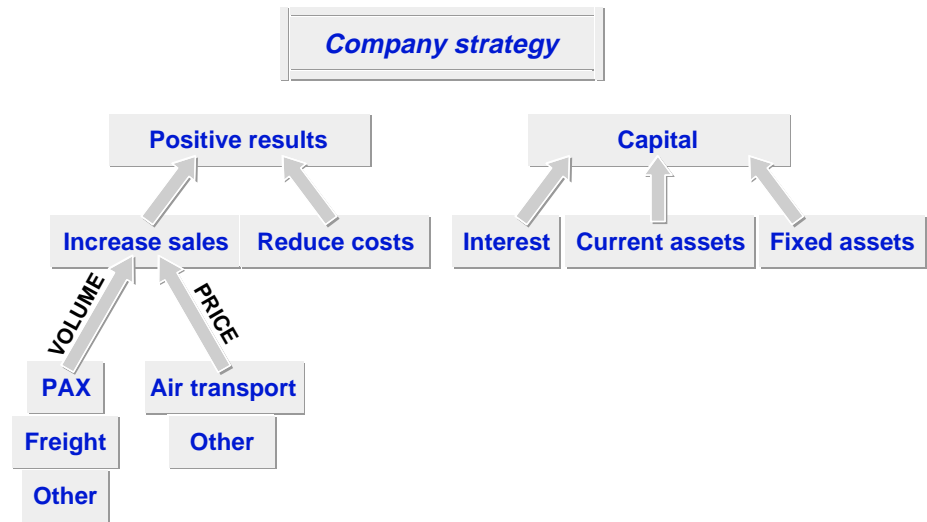


Figure 1

As Figure 1 shows, good results can usually be achieved by manipulating two variables. Rule number one is to maximize sales by increasing volumes (i.e., the number of passengers or amount of freight) and/or the rates an airport charges. Airport fees have stagnated in recent years, being a stable and predictable part of airlines' operating costs (source: ICAO).

Passenger and freight volumes are growing at an average annual rate of 6 to 8%.

Rule number two is to keep a tight rein on costs. Growth in passengers and freight and pressure to keep costs down yield the following:

- Maximize sales --> Product Strategy**
 - Which products ?
 - What quality ?
 - Which customers ?
- Minimize costs --> Process strategy**
 - Process control
 - Airport functions

At this time, there are somewhere between 500 and 1000 systems providing process support of some kind to airports - for aspects varying from physical airport operations to administration.



SAP drew upon modern client/server technology to forge a comprehensive software package for airports. SAP R/3 Airport is designed to automate back-office operations, replacing them with a single all-embracing, powerful system that provides all required functions by way of a user-friendly, consistent graphical interface.

A process-oriented approach was taken to developing this system. SAP has meanwhile incorporated some 1000 “best practice” processes: from order entry through creation of maintenance orders to invoicing of aeronautical fees. This lets you redefine your back-office functions to maximize their efficiency.

Business process reengineering typically involves a juggling act: how do you improve efficiency while continuing to serve customers well? Airports are often faced with this dilemma.

The quality of service that an airport provides directly impacts its market share, costs, and profitability. How well it responds to customer service issues directly correlates with both the size of its satisfied customer base and its potential for winning new clients.

In this dynamic environment, the challenge is to find and implement the most efficient way of providing customer service.

SAP's Solution

SAP R/3 Airport includes all of the back-office business functions that a modern airport needs. This solution is based on SAP's standard software, which was enhanced by adding specific functions to meet the needs of the airport business.-based on the accumulated experience of airports already using SAP software.

R/3 Airport software is modular and can therefore be implemented either as a whole or step by step. But although step-by-step implementation is feasible, SAP has designed its functions along process lines instead of taking a departmental approach.

R/3 Airport can be configured to meet your particular wishes and requirements. An added plus - it lets you benefit from international Best Business Practices for airports.

Release 3.0x of SAP R/3 Airport includes these R/3 modules (see Figure 2):

- Financial Accounting (FI)
- Controlling (CO)
- Asset Management (AM)
- Project System (PS)
- Materials Management (MM)
- Plant Maintenance (PM)

- Service Management (PM-SM)
- IS Retail
- Human Resources (HR)

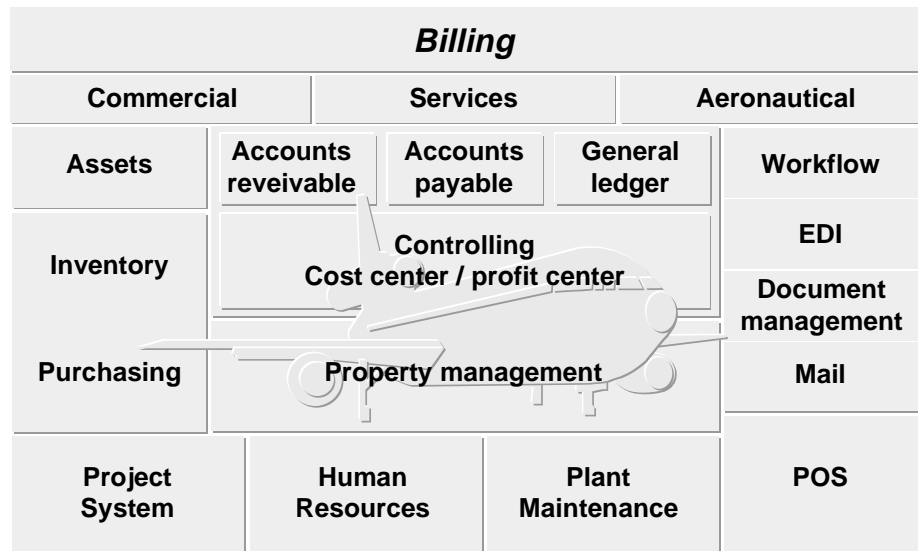


Figure 2

SAP Functionality in Detail

The 5th annual global conference of the ACI (in Washington D.C. on September 13, 1995), adopted Resolution No.4 on Airport Automation and Information Technology, which states:

- “... automation and information technology represents the most attractive means of bridging the gap between the resources of airports and the demands made on them ...
“... most airports are faced with a considerable increase in traffic, typically amounting to a doubling every 10-15 years ...
“... [there is] pressure from governments, airlines, travelers and other interested parties for airports to provide increased levels of service without additional cost, and rethink continuously how they do business.”

These are major challenges, and it is hard to find solutions to them that do not contradict one another. Attainment of these goals calls for an integrated online information system that:

- eliminates data redundancy,
- is flexible enough to easily model structural changes,
- supplies executive information based on reliable, up-to-date data,

- ❑ consolidates relevant data, and
- ❑ has a user-friendly front end.

Organizational Structures

Today's airports have to be flexibly organized, so master data in the business system must support this type of dynamic environment. The R/3 System accomplishes this while maintaining a high degree of integration of all business functions.

As airport management becomes more complex, it is also increasingly vital to offer a solution that addresses the problems of aeronautical fee calculation, commercial exploitation, maintenance, and outsourcing of services.-.and does so in online mode so the financial consequences of activities can be seen and evaluated right away. Release 3.0 of SAP's airport solution is extremely flexible enabling it to meet precisely these requirements.

Maintenance Management

Airport maintenance differs in key respects from similar activities in other commercial environments. As you know, airports have two main categories of customers:

Airline companies

An airport must offer airline companies facilities that will ensure quick, safe, and inexpensive handling of incoming and outgoing flights.

Passengers and cargo

Passengers expect an airport to be readily accessible by car, train, and so on. An airport must also have safe parking facilities, enough check-in counters, and an adequate number of clean waiting areas, restrooms, shops, and restaurants. Everything must be geared to minimizing the time passengers spend waiting, while making unavoidable waits (when, for example, flights are delayed) as pleasant as possible.

The complexity of the airport "production process" is compounded by the fact that both airlines and passengers expect a consistently high standard of service - every hour of the day, and each day of the year.

Maintenance is a process that interfaces closely with other business functions. Maintenance jobs may require spare parts or hiring of subcontractors, for instance - so maintenance departments have to communicate with those responsible for materials management and purchasing.

It is often necessary to service or repair objects that belong to or have been rented to airlines, car rental companies, etc. Consequently, it must be possible to sell maintenance services to them, invoice them as such, and analyze the profitability of these activities.

To meet the requirements of airlines and passengers, various objects and pieces of equipment have to be maintained in direct communication with ramp handling departments. This is essential to prevent them from being scheduled for use at times when they are in storage or undergoing preventive maintenance.

When a major breakdown occurs, it is often essential to decide quickly whether the object in question should be repaired or replaced. One piece of information needed for this is the object's current value.

As mentioned before, it may be necessary to purchase maintenance services from subcontractors, with these services being invoiced afterwards. The resulting invoices are relevant to both management of maintenance activities and financial accounting.

It is easy to lose sight of the fact that maintenance is done by human beings - people whose skills etc. have to be known in order to plan efficiently and effectively.

Maintenance jobs can be so complicated that only project management facilities can reliably prevent budgets from being exceeded. It follows from this that the maintenance management system should be an integral part of the overall airport information system.

Of course, most CAD software packages offer direct online links, showing your technicians which equipment is being repaired, and what sort of repairs are necessary.

Financial Accounting

The central functions of a financial accounting system worth its salt are:

- General ledger
- Accounts payable
- Accounts receivable
- Treasury management

All legal reporting is based on figures in the general ledger, which is automatically fed by subledgers and is very easy to adjust to new or changed requirements.

Liquidity is monitored using information stored in the accounts payable and accounts receivable ledgers, which reflect the purchasing and selling processes. This also includes active credit management, payment programs, dunning procedures, etc.

Because airports are places where people from around the world mingle, they need the ability to use multiple currencies. Having forecasts available in any denomination helps you decide whether or not you need to purchase foreign currency.

Controlling

Planning and controlling of costs and revenues possess key importance in this rapidly changing environment.

The SAP System's cost accounting functionality allows an airport to choose from a wide range of management accounting procedures.

The way most airports are organized, they are forced to monitor the costs and revenues of each organizational unit or cost center. Owing to the sheer size and scope of airport operations, therefore, it is understandable that they would also like to receive relevant information and exert activity-based control by means of ABC costing.

This enables the airport to keep track of the efficiency of its operations.

The profitability analysis functions let you determine the margins at every level of the product/customer matrix, finding the answers to questions like "What is the margin on renting to a specific organization?" or "Which is the most profitable airline for us?"

Property Management

Some years ago there was downward pressure on landing charges in certain countries, forcing airports there to find other ways of increasing their revenues.

The answer was to take advantage of m² for retailing the airport. Even today, some airports make greater profits by exploiting m² than from charges - even helping to keep charges down. However, this only works if you have a system that supports all required functions for administration and management of real property.

The system includes the following capabilities:

- Administration of property data
- Rental
- Rent collection
- Rent adjustment
- Settlement of additional expenses
- Settlement of HVAC costs
- Settlement of administration costs
- Settlement of real estate taxes
- Invoicing and payment transactions
- Input tax revision
- BAV statutory reporting



Service Management & Billing

The key function of an airport is to enable airlines to conduct their activities under the best possible conditions.

Consequently, they must provide a large number of facilities - at landing areas, in terminals, and in the air.

Service Contracts

An airport billing system must handle the following charges for airport facilities and services:

- Billing of aeronautical fees
- Billing of concessions and rental fees
- Billing of services of any kind
- Billing of aeronautical fees

Lately the topic of aeronautical charges has once again been in the spotlight. But no airport would consider revising its price structure unless obliged to do so by the government or commercial considerations.

That is why SAP Airport has been enhanced by adding the Service Configurator. Once you have predefined your billing scheme in the system, this component enables automatic calculation in accordance with each airline's specific requirements. The fees then of course immediately appear in the financial accounting system.

There are virtually no limits to the parameters you can select for calculating your landing and take-off fees - aircraft type, gate number, gate times, etc.

Billing of Services

After a service has been rendered, invoicing is the next step. All service activities performed - including labor, travel, and use of materials - are reported back, making available cost information for appropriate collection. If a given service is covered by a service contract, the R/3 System only bills the customer for the appropriate share of it.

If you require a more involved billing system, there are standard interfaces to the K-AIS package developed by the Ketteler Airport Systems GmbH. This package has already been successfully implemented at several airports in conjunction with SAP R/3.

Investment and Project Management

The balance sheet of any airport reveals that 90% or more of its value typically consists of fixed assets.

This means that nearly every manager working at an airport is confronted with investment programs, budget management and approval, and project implementation.

Almost always, long-term capital investment programs are involved (e.g., for construction of a new lounge or runway). This calls for continual monitoring and management during a period of years.

SAP has recognized this need and provided appropriate functionality as part of its standard package.

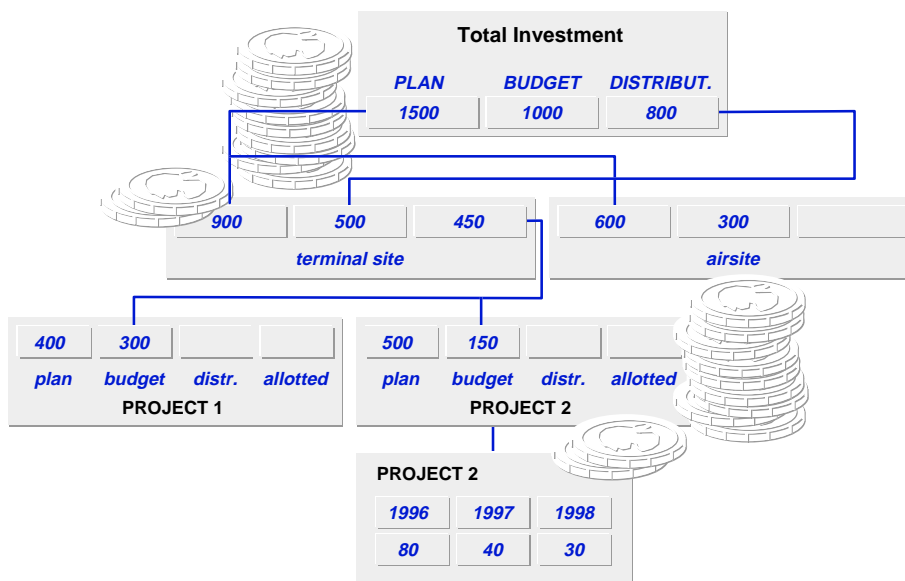


Figure 3: Capital investments standard functionality in R/3

The capital management program lets you manage budgets approved in a given fiscal year (in Figure 3, 1996), which is not necessarily identical with the year or years in which the budgets are to be spent. In fact, it is no problem to spread budgets across several years in the future.

The user-friendly graphical front end makes it quick and easy to create work breakdown structures, networks or Gantt charts.

Using the network you can plan a project's labor, capacity, operating resource and service requirements. The system then automatically generates purchase requisitions and reserves the required materials.

It automatically checks to ensure that funds, capacities, and/or materials will be available when you need them. If a given purchase order exceeds the budget, the system automatically uses workflow techniques to alert the project manager to this fact.

Capacity requirements are monitored, letting you respond quickly to bottlenecks or rescheduling.



The information system gives you project data in realtime. You get the data you require the way you want it - in list or graphical form on actual and planned costs, revenues, open items, schedules, and resources.

Asset Management

Fixed assets constitute the largest part of the balance sheet. Airports need to assess these assets from both commercial and legal standpoints.

From a business standpoint, you need to evaluate assets against the future cost of replacing them. Legally speaking, you need to analyze them with regard to their acquisition value, to take just one example

From a business point of view, it is the depreciation costs that largely determine the m² costs per rented object. The costs of investment projects are periodically capitalized to assets under construction.

Procurement & Materials Management

Procurement of Services

Typically, this activity is not automated, involves a great deal of paperwork, is difficult to track, hard to monitor, and even more difficult to reconstruct.

Airports vitally need to handle this more efficiently, since they subcontract most of their activities.

The solution must therefore include these capabilities:

- Generation of initial specifications for invitations to bid
- Entry of quotation data from bidders
- Comparison of quotations
- Assignment of services rendered
- Entry of services rendered
- Acceptance of services rendered
- Verification of invoices received for services
- Accurate inventory management

Airports have to be fully operational 24 hours a day. The maintenance department must be able to rely on spare parts being available for both planned maintenance and unanticipated repairs. How is this done?

Demands created by maintenance orders, for example, automatically result in reservations, which in turn generate a purchase order to replenish the stocks.



Adequate planning facilities must also be in place to ensure that materials and spare parts are arranged for in plenty of time.

Human Resources Management

A must in any airport environment is a personnel roster system that not only stores the vital statistics of employees and subcontractors, but also keeps track of things like their training, skills, and work experience.

Security measures influence information needs, being directly related to the authorizations and responsibilities of each employee.

Extensive time registration functionality helps airports manage their staff costs by automatically posting employees' working hours to the correct order, project, or cost center.

This functionality is especially essential in airports, which employ many subcontractors; it greatly facilitates the process of verifying invoices received for work done.

Calculation of gross income from salary and net income from gross income is available for almost all industrialized countries

SAP Airport Customers

<input type="checkbox"/> Airport Frankfurt	Germany
<input type="checkbox"/> Amsterdam Airport	Netherlands
<input type="checkbox"/> Singapore Airport	Singapore
<input type="checkbox"/> Copenhagen Airport	Denmark
<input type="checkbox"/> Rome Airport	Italy
<input type="checkbox"/> Dresden Airport	Germany
<input type="checkbox"/> Hamburg Airport	Germany
<input type="checkbox"/> Hannover Airport	Germany
<input type="checkbox"/> Munich Airport	Germany
<input type="checkbox"/> Kuala Lumpur Airport	Malaysia
<input type="checkbox"/> Cairns Airport Authority	Australia