

University of Manchester Institute of Science
and Technology

Department of Computation



CT203: Software Analysis and Design
Lakeland Airways Project

1. Introduction

Background

The Lakeland Airways project is concerned with the specification of a proposed information system. The main objective of this stage is to identify what are the most critical aspects of the operation of Lakeland Airways and what parts of the operation could not usefully be supported by an information system. Unlike previous projects which you have undertaken, you will not receive a rigorous specification of the system- that is part of the aim of this project.

The project will run from the start of term up to early December, at the end of which your group will be expected to submit:

- a detailed business case for the proposed system
- a technical specification of the system
- an outline of the proposed system design

and make a 15 minute presentation outlining the functions of the proposed system, together with a justification of how these functions will assist the business. The presentations will take shortly before the Christmas vacation.

Terms of Reference

This project concerns the development of an information system for a scheduled airline called, *Lakeland Airways*, based in the north of England.

Two systems analysts have already carried out some preliminary investigation work into Lakeland Airways and their reports and the documentation collected are presented below. You are required to:

- analyse the documentation made available to you
- ask your tutor and the module lecturer questions (they will act in the capacity of various airline staff representatives)
- specify a prototype computer-based information system to demonstrate how such a system could support the business objectives and operations of Lakeland Airways and produce a business case for the system.

You are advised to follow the suggested workplan in appendix 2.

Submission of Work

The work expected to be submitted is:

- a system specification document and a business case document (see appendix 3)
- a presentation of the business case for your specification (see appendix 4).

All these items contribute to the overall mark for your project and will be based upon the entire group's submission.

The presentations will take place in early December and should last for a maximum of 15 minutes (you will be

stopped after this time). During the presentation, your supervisor and another assessor will play the role of airline management and the purpose of the presentation is to:

- inform them of your work
- present the main features of the system
- relate the main features of the system to the business of running an airline
- convince them that, as a group, you are likely to succeed in meeting their requirements.

Perhaps the most important way to think of the presentation is as a bridge between the technical specifications you submit and the airline business.

You may assume that the *airline managers* have an elementary knowledge of systems analysis and design models and formalisms.

Group Working

You are expected to work as a group on this project and it is your responsibility to organise group meetings on a regular basis to discuss the progress of the project.

The groups to which you have been assigned are listed separately. Project assessment will comprise of a group mark, together with a mark reflecting an individual's contribution to the group.

It is suggested that at an early stage in the project, you assign specific roles to members of your group. It will then become the responsibility of each group member to oversee the work within their specific role. Suggested roles include:

- group convenor and secretary
- project monitor (for data recording)
- design co-ordinator
- specification standards co-ordinator
- chief technical author.

Your tutor will help you in assigning roles amongst yourselves during your initial tutorial meetings.

It is important that you meet regularly as a group, at least twice per week and that you clearly assign actions and duties to members of the group. You will find it helpful to record any major decisions you take.

Tutorials

Normally, each week you will be expected to meet with your project tutor to discuss your group's progress. Your tutor will provide advice and assistance on the next stage of your work and help you with any difficulties which may arise.

Deadlines, Marking and Penalties

A system specification, business case and project management report must be submitted no later than 4pm on Thursday 19th December 2002.

Presentations will be held during a one week period commencing Wednesday 11th December 2002.

Marks will be awarded as follows (out of 100):

| | |
|-----------------|----|
| Specification | 50 |
| Business case | 10 |
| Presentation | 20 |
| Individual mark | 20 |

Thus 80 marks out of 100 are based on the group's submission. However, where a student consistently fails to attend tutorials, or is deemed to not be contributing to the group's effort, the individual contribution mark (of 20) may be assigned a negative value, thus penalising the student concerned.

Failure to attend the presentation will result in ZERO marks for the entire practical.

Laboratories

You are free to use the PC equipment in the main MSS Building laboratories. These can be found in MSS/H13, MSS/E13, MSS/J1, MSS/J9 and MSS/J10. The laboratories provide word processing, spreadsheet and specification modelling tools.

The laboratories are pre-booked for some taught classes and you should not use them during these periods. Time is allocated for students taking this module. Out-of-hours access is not permitted for undergraduate students.

To use the computers, you must be a registered user. Most undergraduate students who have progressed from the 1st year and MSc conversion course students should already be registered; however some direct entry students may not have registered. Information for new direct entry students can be obtained from the departmental computer support service, located on J floor of the MSS building.

Files

An Access database tool has been developed to assist you in the fact gathering aspects of this project. A copy of the tool can be download from the module web site at: www.co.umist.ac.uk/CT203.

2. Background and Requirements

Lakeland Airways began as a small, charter airline company in 1985 operating holiday flights to Mediterranean resorts. However, a slump in the package holiday market in 1997 has forced the airline to seek new market opportunities. These new opportunities include operating scheduled airline services during the working week to Europe, with holiday charter flights at night and weekends. This balance of scheduled and charter services is good for the airline, since the charter market demands a cheap product, which means night-time and weekend flying, whilst the scheduled market mainly requires flights between 7am-7pm, Monday to Fridays only. The two activities therefore dovetail nicely.

Currently, the Lakeland Airways fleet consists of:

- 4 x Boeing 757 aircraft
- 8 x Boeing 737 aircraft
- 6 x British Aerospace ATP aircraft

As part of its market research strategy, Lakeland Airways investigated the requirements and demands of the scheduled airline market and concluded that to be successful, the airline needed to have its own computer-based reservation and ticket issuing system, together with a system of departure control, i.e. record passengers who have checked-in, assign seat numbers, produce passenger lists, assess aircraft take-off weight etc.

For a number of reasons, Lakeland Airways has decided not to buy in the services from a competing airline as this would impose severe financial and commercial penalties. Firstly, joining an existing airline's booking system would cause Lakeland's flights to be displayed last on a listing of flights. This is commercially unacceptable to the airline's development managers. Secondly, the cost of joining an airline's ticket issuing system is too great at present. It was clear to the feasibility study team that cartels operate so that a very heavy *joining* fee was levied on airlines joining a ticketing system and this prohibited them from joining such systems. Thirdly, the airline did not wish its operational and flying data to be available to other airlines. Fourthly, the most critical part of the various reservation systems, which enable airlines to predict future demand levels, is unavailable for purchase. This is because, for instance, British Airways, earns £85m in extra revenue for every 1% increase in seat occupancy.

In the long term, Lakeland proposes to join one of the main computer reservation systems, however, in the meantime, it recognises that it will have to develop its own system to provide the level of service, security and management information needed for operating a scheduled airline.

The proposed systems would not be required to support the charter or cargo operations of the airline which are operated separately and have their own administrative and IT systems.

Recent developments in the travel trade have caused the airline's management to further review its information requirements. The economic downturn in late-2000 has caused a serious fall-off in trade and desperate attempts are being made to fill otherwise empty planes. As a result, the management have identified the need for a *yield control* system which tracks passenger movements, bookings and flight loadings and enables airline planning staff to maximise revenue by allocating the biggest aircraft to the most popular routes etc. Such a system will also help the airline determine how many full fare and how many discounted fare seats should be offered on any given flight.

All-in-all, the airline's management is not entirely convinced about widespread automation of its information system functions and have therefore commissioned a short study into its viability and requested that a prototype be developed. The airline's marketing department is sponsoring the study and it is your job to advise them by producing a proposed system specification, design and prototype implementation for demonstration purposes.

3. Reports from Operating Units

3.1 Report from the Marketing Manager

The role of the marketing manager is to develop the airline's schedules for the forthcoming season, set fares and generally promote use of the airline. In order to carry out these duties, the manager and his staff have identified the need for more information about passenger movements and loadings on flights, i.e. which flights are heavily booked, how early are they booked etc. With a recent increase in airline competition and the bankruptcy of a large scheduled carrier in the UK, this information need has become even more important.

The manager therefore needs to know for each flight how many passengers were booked for each class of service and how many actual turned up. This information needs to be made available in a variety of forms so that the marketing staff can identify information about loadings (i.e. the percentage of seats booked etc.) on particular flights or groups of flights.

The biggest problem however is recording information about passengers' actual movements. Experiments have shown that simply trying to match passenger names does not provide sufficiently accurate information. Therefore, two schemes have been instituted.

Frequent Flier Scheme

The aim of the frequent flier scheme is to allocate registered passengers with a frequent flier account number. Whenever a registered passenger actually flies, the miles flown, adjusted by a factor relating to the class flown, is credited to the passengers frequent flier account number (FFAC).

As an FFAC accumulates mileage, so the passenger can trade in the mileage for free economy air travel. FFACs are allocated outside the proposed system and ticket agents simply accept vouchers for payment, instead of cash or credit cards. These vouchers are obtained by a passenger from the frequent fliers office.

It is intended to contact out the issuing of travel vouchers to a third party organisation, however, such a contractor would require accumulated mileage to be recorded and a statement of voucher entitlements to be made.

When passengers credit actual miles flown to their FFAC, the actual number of miles flown is credited, adjusted by a weighting factor as follows:

| | |
|----------------|-----------------|
| Economy class | mileage * 0.01 |
| Business class | mileage * 0.025 |
| First class | mileage * 0.035 |

Adjusted mileage can be used to pay for fares on the basis of 1 mile = £1. Mileage is not redeemable for cash, only for vouchers which can be used for payment to the airline.

Part payments using vouchers cannot be made- journeys must be paid either fully in cash/ credit or by vouchers and not a combination of both.

The Frequent Flier scheme is also being used to win customer loyalty and so promote the airline.

Executive Club Scheme

The Executive Club scheme is different to the frequent flier scheme in that points are accumulated, based upon actual travel, which count towards membership of the Executive Club. Club membership permits passengers travelling on the airline's flights to use special airport lounges, complete with complimentary drinks and food, prior to departure.

Each club member is assigned an executive club number (ECN). For the purposes of calculating free membership, points are awarded as follows.

Free membership is obtained if a club member achieves 400 points in any one year.

| | |
|-----------------------------------|------------|
| Domestic single flight | 5 points |
| European economy, single | 10 points |
| European business, single | 20 points |
| Intercontinental economy, single | 30 points |
| Intercontinental business, single | 50 points |
| Intercontinental first, single | 100 points |

The main aim is simply to record passenger movements.

The Marketing Manager has sent the following details of the Executive Club to the airline's operational staff:

With immediate effect, the airline is introducing an executive club to which airline passengers can join. The aim of the club is two-fold; firstly to encourage scheduled flight passengers to choose Lakeland Airways in preference to other competing airlines and secondly to enable the marketing department to build up detailed passenger profiles so that marketing mailshots can be directed to specific individuals.


Upon joining the club, members will register with their name and address and in return receive a membership number, luggage tags, a membership handbook and free insurance and medical cover when travelling abroad using our flights. Where applicable, members will have access to special lounges when travelling on Lakeland Airways. Initially, members join by paying a £75 membership fee, although once they have accumulated 250 points they will receive free membership. To maintain membership, they must gain 250 points every year of their membership, otherwise, otherwise membership lapses.

It is absolutely vital that when a member travels with our airline their membership number is recorded, together with their flight number, date and destination: a sample of the return form is shown below and this should be forwarded to the Executive Club offices after each flight has checked-in.

When passengers check-in they should be directed to the local lounge, if applicable.

Prior to departure of a flight, the seat allocations of executive club members should be passed to the cabin crew for the flight, so that they can treat the members appropriately. Cabin service are currently undergoing training for this.

**Lakeland Airways
Executive Club**



Flight: _____ Date: _____

Please list membership numbers below.

Signed: _____

The following table shows the number of frequent flier and executive club members who are on board any given flight:

| | FF | EC | Both |
|---------------------------|-----|-----|------|
| Domestic | 12% | 7% | 7% |
| European economy | 3% | 2% | 1% |
| European business | 22% | 12% | 8% |
| Intercontinental economy | 10% | 6% | 4% |
| Intercontinental business | 19% | 8% | 7% |
| Intercontinental first | 45% | 25% | 15% |

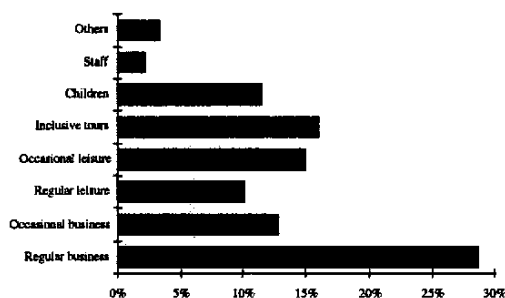
Reports from other airlines suggest that whilst only about 2% of their passengers are members of loyalty clubs such as the Frequent Flier Club or Executive Club, they can account for up to 22% of airline revenue. This makes them commercially important people.

Corporate Discounts

A possible future *loyalty* scheme which the airline may wish to implement- although it is definitely not a requirement at present- is the ability monitor airline sales by large corporate clients, with the view to offering discounts for preferential use of the airline.

Market Research

Based upon market research conducted by the airline's agents, the following chart showing a breakdown of the airline's passengers has been obtained.



General Rules and Information

In both schemes, the passenger's FFAC or ECN must be written to a log together with appropriate information, including the origin and destination of the flight and class travelled. In the past, it was decided that whilst passengers may join the frequent flier scheme and the executive club, any given flight may only be credited to one of the two

schemes. FFAC and ECN numbers are all 6 digits in length. FFAC numbers run in the range 000001-499999 and ECN numbers run in the range 500000-999999.

However, to simplify matters in future, it has been decided to integrate the two systems and simplify them. The new club will be known as the *Lakeland Premier Club*. All members will be given a single membership number in which they can accumulate both frequent flier miles (to be known as *Premier Miles*) and executive club points (to be known as *Premier Points*).

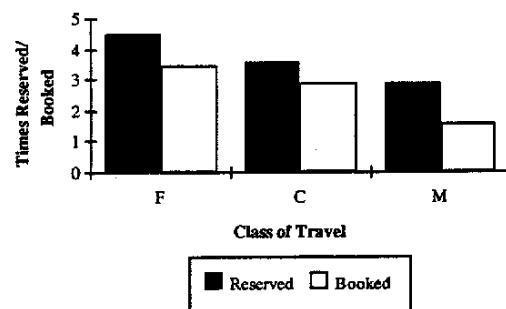
Information Usage

At present the Marketing Manager is not clear how the gathered information will be fully utilised, but ideally his team would like to generate a series of ad hoc queries to interrogate a database about passengers travel profiles. The information will also be used for mailshot promotions to particular passenger groups e.g. a European fares promotion might be mailed to those passengers who have travelled to Europe more than 3 times in the past year. The high cost of producing promotional material and the postage necessary to distribute it however, will probably mean that only the airline's most frequent customers will be mailshot.

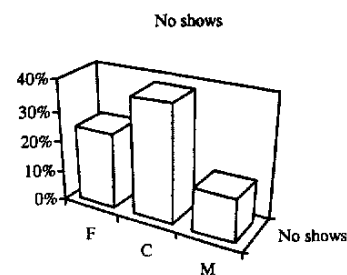
Overbooking

The airline has a policy of overbooking some flights in the economy class only. This is because higher class passengers often cancel or change reservations at the last minute and seats in these classes become available.

The following chart shows the number of times a seat is reserved and booked on a given flight for the main classes of travel.



The following chart also shows the percentage of *no shows* on average per flight for each class of travel.



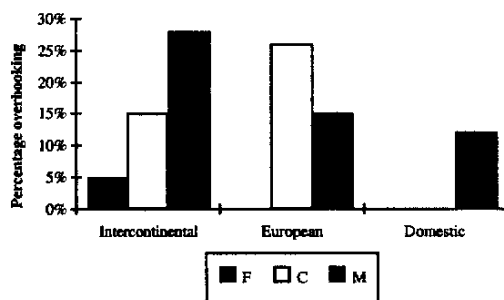
The precise number of seats which can be overbooked

varies between flights, it is not the same on different routes and even changes on the same route. This is because on some flights the airline knows that business and first class passengers are more likely to cancel than on others.

Where overbooking occurs, resolving seats to passengers is carried out locally, as different rules apply in different countries. Where possible the customer service staff *bump* passengers into higher classes. Failing that, they offer compensation or alternative carriers.

The Marketing Manager sees the policy of overbooking continuing in the future and expects to sell about 15-20% more economy seats than are available on most flights. At present, overbooking only occurs on the standard economy fare seats (ticket basis Y- see below).

The following chart shows the industry average levels of overbooking on different flights and classes of travel. Such overbooking is essential to the airline's profit margins as it enables flights to operate at much closer to full capacity. However, only with appropriate computer support can such overbooking be effectively managed. The requirements of the Marketing Manager therefore include the ability to define the percentage of overbooking per flight, generate a report showing the actual overbooking per flight and an exception report where the percentage of overbooking or near-overbooking has been reached.



3.2 Report from Sales Manager

The sales manager is responsible for receiving bookings for the airline's flights. Each flight has one or more classes of service (First, Business and Economy). Traditional these flight classes are referred to as F, C and M or Y, respectively. Domestic flights are economy only; European flights offer business and economy classes and intercontinental flights offer the full range of classes.

Flights offer a range of fares, which usually dictate the class travelled. Some fares further impose booking and cancellation restrictions. Normally, the cheaper the fare the further in advance it must be booked and the less scope there is for cancelling or changing a reservation.

When a member of the public books a seat on a particular flight, the sales department requires a record of the booking and the issue of a ticket.

Normally, a ticket may only be issued when the fare is paid, although for some fares, a reservation can be held and not confirmed. Obviously, at some later date the reservation must be confirmed, a ticket issued and payment made.

For the purposes of convenience and for compatibility with other airlines' systems, all tickets sold have an associated *ticket basis*. This is a coded mnemonic representing the various rules and restrictions which apply to the ticket, together with the class in which the ticket holder is entitled to travel.

The main rules for booking and cancelling reservations and confirmed tickets are as follows:

| Ticket Basis | Reserve | Confirm | Min. Stay | Change |
|--------------|------------|------------|-----------|---------|
| F | anytime | anytime | none | anytime |
| C | anytime | anytime | none | anytime |
| CP | anytime | anytime | none | anytime |
| Y | anytime | anytime | none | anytime |
| YAP | d> 7 days | d> 7 days | Sat.ngt | d>7 dys |
| YAP7 | d> 7 days | d> 7 days | 7 days | n/a |
| YAP14 | d> 14 days | d> 14 days | 7 days | n/a |
| YAP30 | d> 30 days | d> 30 days | 7 days | n/a |
| YAPW | d> 7 days | d> 7 days | 10 days | n/a |

d= date of departure

n/a= not allowed

Passengers with ticket basis F, may travel first class (F); passengers with ticket basis C, may travel business class (C) and all other passengers travel economy class (M).

Children under 12 pay 50% of the relevant fare. These fares have a ticket basis code C50 appended to the main ticket basis, e.g. YC50, YAP14C50 etc.

All ticket bases YAPn, where n is blank, 7, 14, 30 or W, may hold reservations for 14 days only, after which the reservation becomes void.

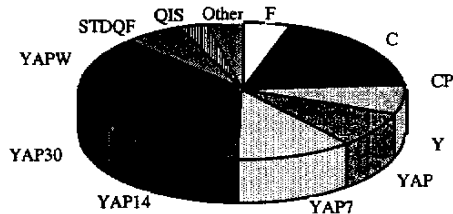
All tickets issued must carry appropriate endorsements relating to the terms and conditions of the issue of tickets.

The sales manager's main aim is to try and make sure every seat on a flight is filled- offering discounted seats where necessary. Obviously, the airline is not anxious to fill every seat on a flight at the cheapest price possible, so the sales manager and his staff only make the more discounted seats available when it is clear that an aircraft is not going to be full. Thus as the departure date for a flight approaches, he will release more seats at discounted prices. This is achieved in two ways: firstly by increasing the availability of economy fares (ticket basis YAP, YAP7, YAP14...) and by offering tickets with a ticket basis STDQF (short-term discount- quick-fill). In addition, ticket basis type QIS, is a ticket which can be issued prior to the day of departure only; if seats are available. The class travelled is also type Q, which means that the passenger is allocated to any free seat in economy or business classes. Economy seats are filled first. The ticket must be reserved and confirmed at the same time and no change or cancellation is allowed.

Once a return ticket has been booked and the outward leg of the journey used, only tickets with basis F, C or Y can have the return leg changed.

Tickets are only issued if payment has been made by the customer to the airline or the airline's authorised ticket agents.

The following chart shows a breakdown of sales by ticket basis type. STDQF and QIS are old types of ticket basis which are no longer available.



It has been agreed by the airline's Marketing and Sales Managers, that there are too many special ticket bases and in future ticket basis QIS and STDQF will be discontinued. The main controls therefore to increasing ticket sales will be to amend the percentage of tickets available at discounted economy rates (e.g. YAP, YAP7 etc.).

With better computer support, it will not be necessary to change the percentage of seats available once the timetable for a year has been finalised. The percentages will be set well in advance by the Planning Manager, you will therefore need a breakdown of the pattern of ticket sales for each flight operated by the system. In particular, she will require the number and percentage of tickets sold for each ticket basis for each week leading up to the departure of a flight. This will be required for every individual flight and also aggregated for every flight, e.g. a summary for each flight in the year.

3.3 Report from Ticket Agents Manager

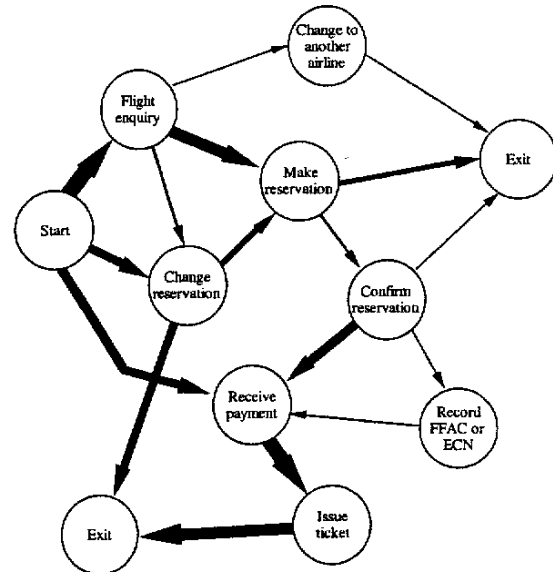
The ticket agents manager is responsible for liaison with the airlines ticket agents, i.e. travel agents and those empowered to issue the airlines tickets. The airline has about 2,500 authorised ticket agents throughout the world, although most (about 75%) are based in the UK.

As part of its marketing strategy, Lakeland Airways has joined a consortium of small airlines who between them are supplying ticket agents with pcs and communications equipment, so that the ticket agents can access the consortium's computer reservation systems.

The main functionality the Ticket Agent manager requires for use by ticket agents is as follows:

- display of flights on a particular route, with options to display details for a particular, day or range of days on selected classes
- ability to hold and cancel reservations
- ability to hold and cancel confirmed bookings, together with ticket issuing.

An activity chart for a typical ticket agent is shown below:



Standard Fare Calculations

The flight details data file gives fares for all journeys for most ticket basis (F, C, Y, YAP, YAP7, YAP14, YAP30, YAPW). The fares are quoted as follows:

| | |
|-------------|----------------------------------|
| Single fare | F, C, Y |
| Return fare | YAP, YAP7, YAP14, YAP30, YAPW |

The following notes apply:

- Return full fares, F, C and Y are twice the single fare
- YAP, YAP7, YAP14, YAP30, YAPW fares are return only- single journeys cannot be made
- Travellers can have open jaw tickets using any ticket basis, in which they arrive at one airport and depart from another; e.g. Manchester to New York and Washington to Manchester; these fares are calculated as follows:
 - full fare tickets (F, C, Y): add the single fares together
 - discounted tickets (YAP, YAP7, YAP14, YAP30, YAPW): add the two return fares together and divide by 2

Note that open jaw tickets only apply to journeys outside Europe and travellers must arrive and depart from the same continental group (e.g. North America, Africa etc.)

QIS Fares

The QIS ticket basis is a standby fare. The fare is calculated as the cheapest fare available, less 5%. There is no restriction on the number of tickets which may be sold on this basis, provided that they are issued no earlier than the day before departure.

STDQF Fares

The prices of the STDQF tickets are the same as the cheapest normally available, less a discount factor of 15%. STDQF tickets are always return fares and open-jaw travel is not allowed.

Ticket Regulations and Notes

Cancellations and refunds can only be made on appropriate types of ticket. Any refund is made directly by the airline.

Tickets are not transferable to other passengers. Changes of name can only be made by cancellation of the ticket and reissue.

All tickets are priced and charged in UK sterling and all individual ticket prices are rounded up to the nearest £.

Customers may only upgrade a ticket to a higher price if the ticket basis is F, C or Y. Any ticket with a YAPn basis may only be changed to a different ticket basis if cancellation is permitted.

Ticket agents are paid a 9% commission on their ticket sales on behalf of Lakeland Airways. At the end of each month they currently, manually complete a returns form detailing each ticket sale. The return includes the following information:

- date of ticket sale
- flight number and departure date
- ticket basis
- passenger's name
- cost of ticket.

The Airline as a Ticket Agent

As well as authorised ticket agents, the airline is also its own ticket agent and its staff can perform all the duties of a ticket agent. In addition, the airline's staff, with the permission of the station controller, can override the rules for booking and issuing tickets (i.e. a YAP7 ticket could be issued less than 7 days before departure). This is necessary so as to allow the greatest operational flexibility- however the airline clearly does not want this function to be available to general ticket agents.

Ticket Agents Questionnaire

The Ticket Agents manager and Marketing Manager have recently received the results of an exhaustive fact finding study of the airline's ticket agents conducted by the airline's market research agents.

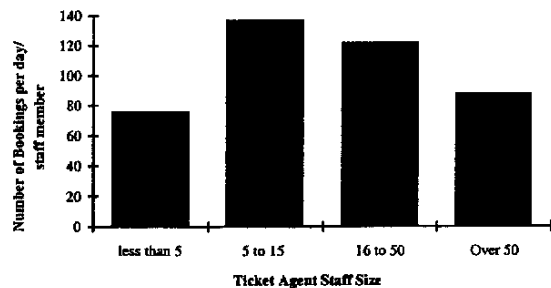
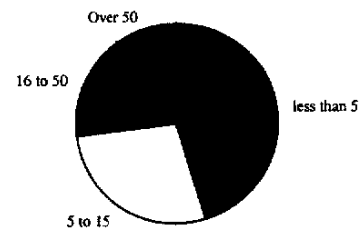
The aim of the study was to identify the perceived needs of the airline's ticket agents and assess any impact these needs might have upon any future automation of the airline's reservation and ticketing system.

This management summary provides an overview of the main findings.

General Analysis

The following charts show the average number of staff employed in making reservations per ticket agent and their average level of business.

Breakdown of Ticket Agent Staff Size



Perceived Needs

Ticket Agents feel that they need the greatest help in identifying the dates and times of flights to meet their customers needs. Many passengers typically need to make multi-leg journeys and therefore any computer-based system needs to help the agent build up a series of journey legs.

A frequent customer enquiry is to have a breakdown of all the possible fare options on a particular journey (i.e. different classes of travel available, APEX fares, booking restrictions etc.)

Ticket Agents feel the need for better support in selecting the best value tickets for their customers, given that the customer has outlined their departure dates. For example, if a departure is to be made very soon, they do not want to know about tickets where a long lead time is necessary for booking.

Potential Problems

Most ticket agents expect to use more than computer-reservation system. Therefore, whilst they recognised that their staff would be computer literate, they perceived problems in having to learn several different interface skills.

Several ticket agents reported that with some CRS systems, you can identify a complex multi-leg journey, but that when you come to book the journey, you have to start respecifying the individual journey legs all over again! Clearly this should be avoided in any future development.

Ticket Agents feel that they could provide a better service by knowing all the tickets available on a flight, even if they might not be available on the particular dates of travel. They can then advise their customers, for example, that if they delayed their departure by a certain number of days,

they might be able to travel at a reduced fare on a different ticket basis.

Ticket agents have also reported that they feel that the airline appears slow to respond to changes in demands for flights. For example, it was some time before Lakeland Airways started to operate flights to Brussels, in spite of the fact that many people tried to book such journeys.

Assumptions

The following assumptions can be made about Ticket Agents:

- they are fully aware of the standard IATA airport codes
- they do not necessarily know the full range of ticket basis options and the restrictions pertaining to them
- 24 hour, worldwide access to any booking and ticketing system would be required.

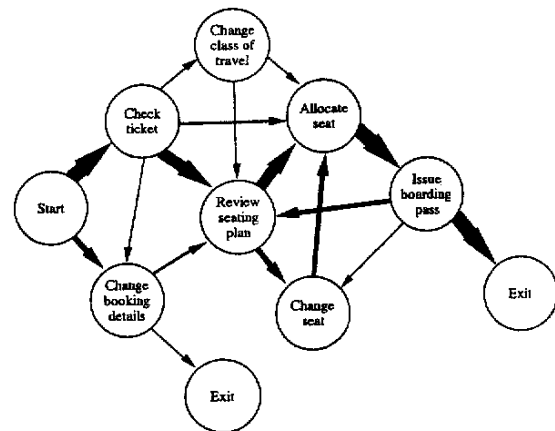
3.4 Report from Customer Services Manager

The customer services manager is responsible for check-in and all activities relating to passengers between their arrival at an airport and the departure of the flight onto which they are booked. The main customer service operations:

- checking that passengers have confirmed reservations
- assigning seats to passengers, giving the option of smoking and non-smoking areas, window or aisle seats- also providing advance check-in for onward flights of multi-leg journeys
- changing seat allocations
- changing flight bookings and routing, where permitted by the type of ticket purchased
- recording frequent flier or executive club numbers
- recording the weight and number of bags checked in for a flight- all checked baggage is allocated a six digit number based upon the destination label the customer services operator attaches to the bag
- reminding passengers to go to the boarding gate; for domestic services, 15 minutes before departure; for European services, 20 minutes before departure and for intercontinental services, 40 minutes before departure
- at the departure gate, checking that all checked-in passengers have boarded the aircraft- typically one or two passengers forget to go to the departure gate at the correct time and customer service staff must make an announcement across the airport calling for the remaining passengers; for every hour a flight is delayed, it costs the airline £5,000 in fuel and airport charges.

The job of ensuring that checked-in passengers have boarded is increasingly recognised as a critical part of the customer services staff's role. It has been estimated that for every hour an aircraft is standing idle on the ground, waiting for the last passenger to board, the airline losses £300 every 5 minutes.

An activity chart for the checking-in process is shown below:



Customer Service Agent- Job Description

The overall aim of customer service personnel is to act as a liaison point between the airline's customers and the operational side of the business. This job description relates to those customer service personnel based at UK and overseas airport terminals. Overseas staff should check locally for additional duties and functions.

Our customers represent our present and future business and it is therefore important that your manner and dealings with customers show the airline in a good light.

Overall Duty Summary

This section summarises the main areas of duty with which you will be involved. Generally, customer service staff will be rotated between duty areas on a weekly basis. The main duty areas are:

- check-in desk
- special requirements supervision
- gate control
- arriving passenger reception
- departure announcements
- transfer desk
- departure lounge enquiry desk

Check-In Desk

Duties at the check-in desk currently employ a manual system which should shortly be replaced. Staff will be informed when the changeover will take place. At present however, when passengers present themselves for check-in the following procedure should be adopted.

- check passengers' ticket for departure and destination airports, date and time of flight and flight number. Where a passenger has lost their ticket, they may still be eligible for carriage- check with the master booking list of the passenger's name. No boarding pass should be issued until the flight is closed so that in the event of a fraud and the real passenger turns up with a valid ticket, only the valid passenger may board.

- b. passengers should be advised of any change in their flight- delays, reroutings, cancellations etc; this information is available from the despatch controller who is assigned to supervise the flight (note that a controller will be assigned, even if the flight is cancelled)
- c. take the passengers' ticket for the current leg of their journey and, using the seat allocation plan (see diagram) allocate the passenger a seat of their choice- smoking, non-smoking, window or aisle. Record the passengers' name on the seating plan. Only one seating plan per flight should be available and this will be passed to you by the despatch controller four hours before the departure of the flight.
- d. record any special requirements the passenger has on the passenger seating plan- this will be checked by the special requirements supervisor during the check-in period
- e. all passengers must present themselves within 20 minutes of flight departure, after this time the despatch controller must be consulted and his permission given for late check-in
- f. check that all passengers' baggage is labelled with the destination airport and follow the local baggage handling practice for baggage loading
- g. all passengers are allowed a 20kg baggage allowance, although first class passenger are allowed an additional 10kg- excess baggage must be paid for in advance to check-in and passengers over their limit should be sent, with their baggage to the excess baggage clerk who will issue a receipt indicating payment
- h. write out a boarding card for the passenger, inserting their name, flight number, destination, date and any special requirements
- i. first class passengers should be invited to go to the first class or club lounges, where these exist
- j. where a passenger holds a frequent flier account number, record their mileage and class travelled on the special needs column of the passenger seating plan

Separate check-in desks will generally operate for different flights and passenger classes, although at smaller airports this may not always be the case.

Where overbooking has occurred in economy cabins, passengers should be 'bumped' to business class (but never first class) in the following order:

- i. frequent flier club members
- ii. full fare economy passengers
- iii. other economy passengers
- iv. special promotion tickets, including frequent flier 'free' tickets
- v. employees
- vi. others.

Where no seats are available in business class, check-in staff should refer to the local station manager who will arrange compensation and alternative travel arrangements for passengers unable to be allocated a seat.

Special Requirements Supervision

A number of the airline's passengers have special requirements, such as the need for a wheelchair or supervision of young children flying alone. This duty requires you to monitor these needs, as expressed by customers either when they book or by other customer service personnel at the check-in desks, and arrange the necessary services.

| Lakeland Airways: Passenger Seating Plan | | | | | |
|------------------------------------------|-------------|---------------------|------|----------------|---------------|
| Flight number | | From | | To | |
| Date | | Depart time | | | |
| Expected departure time | | Despatch controller | | | |
| Aircraft type: 737 747-400 | | | | | |
| Seat number | Smoke NS | C | Name | Baggage weight | Special needs |
| 01A | NS | C | | | |
| 01B | NS | C | | | |
| 01C | NS | C | | | |
| 01D | NS | C | | | |
| 01E | NS | C | | | |
| 01F | NS | C | | | |
| 02A | NS | C | | | |
| 02B | NS | C | | | |
| 02C | NS | C | | | |
| 02D | NS | C | | | |
| 02E | NS | C | | | |
| 02F | NS | C | | | |
| 03A | S | C | | | |
| 03B | S | C | | | |
| 03C | S | C | | | |

At most airports, a wheelchair facility is provided by airport porters and staff should check locally about these arrangements. Where the service is not provided, the airline has a number of wheelchairs available and customer service staff will need to collect passengers from the check-in area and take them to the aircraft and from the aircraft through to meeting points in the arrivals area.

For young, unaccompanied children, a member of the customer services staff will be appointed each day to supervise the children and ensure that they are boarded upon the correct flight. Once on board, cabin service staff will supervise the children until arrival at their destination whereupon local customer service staff should escort children to the meeting point in the arrivals area.

Gate Control

The aim of gate control is to ensure that no unauthorised passengers or staff board an aircraft. All authorised staff will carry an airport identity card (issued locally) and passenger will have an appropriate boarding card.

20 minutes before departure, check-in staff will bring a completed seat allocation schedule and, providing that the despatch controller and captain have given their permission, passengers should be invited to board the aircraft. If first class passengers are travelling they should be called forward first, followed by economy passengers in

reverse seat row order, followed by business class passenger (who generally arrive late).

As passengers board, tick off the passenger's entry on the seat allocation form. When the gate area is clear, check that all passengers are accounted for. If there are passengers who have checked-in and have not boarded, inform the departure announcement staff who will call the remaining passengers.

When all passengers are accounted for, including those who have not boarded (they might have decided not to fly after all), pass the passenger seat allocation list to the despatch controller who will give it to the cabin staff and flight captain. A photocopy of the allocation should be made beforehand and kept in the company's offices.

Arriving Passenger Reception

When an inbound flight arrives, customer service personnel should meet arriving passengers at the gate at which the aircraft arrives and escort the first passenger all the way through the arrivals hall. On international journeys this will mean seeing that they pass through passport control and customs. Once one passenger has been shown the way, the others tend to follow, although you should make sure that none go astray. Airport security personnel using ensure that passengers- departing or arriving- do not get lost.

Departure Announcements

Announcements regarding the arrival and departure of flights should be made. Passengers intending to travel should be advised of the flight details at 60, 30 and 10 minutes before departure time. Where a passenger does not present themselves at the boarding gate, you will be asked to make an urgent call for them. It is generally more effective to call passengers by name.

Transfer Desk

Where a transfer desk exists, its purpose is to check-in passengers on incoming flights. The procedures are exactly the same as for normal check-in.

Departure Lounge Enquiry Desk

Where a departure lounge enquiry desk exists, its purpose is to answer passenger queries. Typically, passengers will want to know whether they can change their seat, when the flight is due to depart, what time will they arrive at their destination, request special arrangements, such as food, wheelchairs etc.

Special Arrangements for Overbooking

From time to time, the airline finds it necessary to overbook passengers on a flight. Where this happens, the following strategy will be used- although subject to amendment by the local station manager.

- a. passengers will probably start checking-in as normal. At some point during checking-in (although sometimes before as well), the local station manager will block out a number of seats on the aircraft- in business or economy classes. These seats should not be assigned to passengers under any circumstances.

- b. During check-in, check-in staff should mark the *special needs* column of the passenger seating plan with the code SFU (suitable for upgrade) for any passenger who would be suitable for upgrading from economy class to business class (NB. nobody is ever upgraded to first class unless the whole cabin is empty.)
- c. Shortly before departure, the local station manager will authorise that passengers marked SFU are upgraded.
- d. The local station manager will then make a decision who is to be carried in the vacated seats and the seats previously blocked out of the system. Priority will be given to those passengers with onwards connections or are Executive Club or Frequent Flier members.

3.5 Report from Despatch Controller

The despatch controller is responsible for the safe despatch, i.e. take-off, of an aircraft. The controller must ensure the safe loading of passengers and baggage, that the aircraft is in an operational condition as certified by the several mechanics who service and attend an aircraft whilst it is on the ground and calculate the payload of the aircraft.

Weight is calculated by adding the weight of all checked baggage, together with a nominal weight per passenger of 87 kgs (this is based upon average passenger weight, plus an allowance for 1 piece of hand baggage). An allowance for the flight and cabin crew must also be made. All aircraft have two flight crew and their combined estimated weight is 160kgs.

Weight also includes the total weight of cargo carried by the plane. Cargo handling is a separate operation from the CRS and despatch control system and a total cargo weight is simply reported to the despatch controller shortly before departure. The despatch controller is also informed of any dangerous cargo (flammable liquids, firearms, explosives etc.) which is loaded.

The despatch controller is responsible for ensuring that all bags checked-in for a flight and only those bags are loaded. New UK government regulations come in to force next year, known as *Triple A*, the *Authority and Accountability of Airline Baggage Regulations*. The airline will be expected to conform to these regulations.

Before an aircraft can take-off, the despatch controller must inform the flight deck and cabin crews of the total payload weight, special cargoes loaded, the names of passengers, special dietary or other requirements, seat allocations and special passengers (such as deportees, children travelling alone, prisoners in transit, passengers requiring special help such as a wheelchair etc.).

A flight may not depart until the ground mechanics, flight captain and despatch controller have all signed-off an aircraft for departure. These signatures, together with a passenger list must be sent immediately after departure to the airlines operation control centre.

The despatch controller and *Pilots Liaison Committee* have expressed some concern in the way that check-in staff have allocated seats on some flights. The most economic way of flying is for passengers to be evenly distributed throughout an aircraft- not all bunched up at one point in the aircraft. It is envisaged that any new check-in system would

automatically distribute passengers so that they were balanced across an aircraft. The airline's safety officer and *Technical Advisory Committee* have reported that this is essential for the smaller aircraft in the company's fleet, if a smooth flight is to be achieved. Unbalanced aircraft cause a danger when landing as a plane's tail may scrap the runway and uses additional fuel.

3.6 Report from Catering Section

The Catering Section is responsible for ensuring adequate provision of food on board a flight prior to departure. The food loaded is dictated by the number of passengers travelling in a particular class: first, business or economy, irrespective of the fare they paid. The predicted passenger information must be available 24 hours before departure, although a final check is made 2 hours before departure to cater for any last minute changes.

Passengers requiring vegetarian, kosher or fat-free menus must indicate their requirements when confirming a flight reservation, up to 24 hours before departure. This information, together with the assigned seat number of the passenger must be made available to the cabin crew immediately before departure so that special diet meals can be given to the correct passengers.

The Food Regulations Act (Health and Safety) 1991, requires that certain foods, including cold meats, sandwiches, snacks and dairy products, must be kept in refrigerated conditions at all times and may only be removed 2 hours prior to serving. The airline's catering manager therefore stresses the need for the ability to have an up to date passenger count for each flight, up to 1 hour before flight departure.

3.7 Report from Planning Manager

The Planning Manager is seen by the airline's chief executive and board as playing a critical role in the long-term survival of the company's business. Her role is to decide how many seats to make available on a flight; at what price and even if a flight should even continue to operate.

To do her job, she needs detailed information about how many tickets were sold, at what price, on what day, on what flight. In particular, she and her staff will be interested to know not just the final result of the sales team, but how a particular flight's sales built up over a period of time- so that in future she can predict when a flight needs more or less discounted seats in order to achieve sales. She will also require information about no shows on a flight- how many there were in each class and ticket basis, so that overselling can be undertaken where a flight is particularly prone to a no shows.

The Planning Manager has also expressed the need to know what flight enquiries and bookings are not being satisfied. For example, where a flight is fully booked or where there is no flight between two destinations (either at all or within a particular time period). This requirement is widely accepted as being particularly important by all airline managers, as well as the Planning Manager, however it is perceived that it would be difficult to persuade ticket agents to report reasons for non-booking after an enquiry. Lakeland management hope that some form of automation may assist in this process.

3.8 Report from the Chief Station Controller

Station controllers are those airline personnel who are based at the various airports frequented by the airline. They have sole responsibility for the commercial and operational aspects of the airline's business on a day-to-day basis, except for those responsibilities assigned to pilots and local, statutory authorities (e.g. the local aviation authority etc.)

The job of the Station Controller with respect to the normal operations of the airline include the following:

- a. The station controller decides when a flight is to be opened for check-in and instructs the customer services manager at the airport to open check-in. The customer service manager decides how many check-in desks should service a particular flight- this depends upon how many check-in desks the airline has leased at a given airport. At the main operational bases, the airline leases many check-in desks and each desk will service a particular class of travel (e.g. first class, business and economy). However, at smaller remote stations, one or two check-in desks will often service all classes on a particular flight.
- b. The station controller decides at what point check-in should close.
- c. The station controller, subject to local legal restrictions and legislation, must decide how to handle overbookings on flights. In many cases, this is operated on a first-come, first-served basis. However, in some countries, the law requires the highest paying fare passengers to have priority. The implication of this is that even when a passenger has boarded a flight, they might be *bumped off* the flight to make way for a higher fare paying passenger. Of course, the reverse may work in which a low paying fare passenger is bumped up to a higher class of travel that their ticket warrants.
- d. The station controller has the right to block book seats on a particular flight for a variety of reasons- privacy of VIPs, for use as a contingency when overbooking occurs etc.
- e. The station controller monitors the day's flight, maintaining a list of all flights due to leave on a given day, the number of passengers booked into each class, the status of check-in- in terms of how many passengers have checked-in and how many have boarded a flight.

Airports currently served by the airline (together with their internationally assigned IATA airport code) are:

UK Domestic Airports

| | |
|-----|-----------------------|
| BAR | Barrow-in-Furness |
| BFS | Belfast International |
| CAM | Cambridge |
| EXE | Exeter |
| GLA | Glasgow |
| LGW | London Gatwick |
| LHR | London Heathrow |
| MAN | Manchester |

NCL Newcastle

International Airports

| | |
|-----|-----------------------------------|
| ATH | Athens, Greece |
| BRU | Brussels, Belgium |
| CDG | Paris (Charles De Gaulle), France |
| COP | Copenhagen, Denmark |
| FCO | Rome, Italy |
| LIS | Lisbon, Portugal |
| MAD | Madrid, Spain |
| NAP | Naples, Italy |
| TXL | Berlin, Germany |

The airline has its main operational bases at Manchester and Barrow-in-Furness.

3.9 Report from the Chief Cabin Services Director

The Chief Cabin Services Director is responsible for the cabin crews on all flights. The cabin crew have three aspects to their job:

- to assist the captain in flight safety by: demonstrating safety equipment, ensuring that the correct number of passengers are on board, assisting in emergency procedures and being aware of any special cargoes or passengers
- to ensure that passengers are seating in the cabins in which they are entitled (i.e. first, business and economy)
- to provide cabin service- by serving food and drink, meeting the special requirements of children, the elderly, disabled and those with dietary requirements.

The number of cabin crew on a flight is as follows:

| Aircraft Type | Destination | Number of Cabin Crew |
|---------------|-------------|----------------------|
| 737 | Domestic | 4 |
| 737 | Europe | 5 |
| 757 | Domestic | 8 |
| 757 | Europe | 7 |
| ATP | Domestic | 2 |
| ATP | Europe | 3 |

A recent review of cabin service has highlighted the need for passengers to be addressed by name wherever possible. Therefore, in each galley, the cabin service director for the flight is required to post a seating plan, together with names of passengers.

The average weight of cabin crew is 68kgs.

3.10 Report from the Chief Pilot

The airline's pilots assume a very important role in the airline's business in so much international law makes a flight's captain the sole person in charge of a flight. A captain has full authority over an aircraft, its crew and passengers and has the final decision in whether an aircraft should take-off, land, divert to another airfield, flight path and routing etc.

The main information required by a captain prior to departure is a full summary of the passengers boarded, cargo loaded, estimated weight of the aircraft and its contents, flight information (flight number, origin and destination airports, distance in miles) and any special cargoes or passengers. Much of this information is provided by the despatch controller, who brings the appropriate listings and information to the flight deck. Captains would not normally obtain this information directly, as they cannot leave the flight deck once cargo or passengers have started to be loaded onto the aircraft.

Prior to departure, the captain, flight engineer and despatch controller must sign a load sheet, detailing all aspects of the aircraft and certifying its airworthiness. This is a legal requirement and a copy of the signed form must be deposited with the Civil Aviation Authority's representative at the departure airport in the UK, the Federal Aviation Authority's representative at the departure airport in the US and national equivalent in all other countries.

3.11 Report from the Chief Security Officer

The Civil Aviation Authority, Federal Aviation Authority, IATA and other legislative and advisory organisations have a number of guidelines relating to security which system developers need to be aware of in their specifications and designs.

- The number of bags in an aircraft's hold should tally against the list of passengers on board. Nobody should be allowed to check in a bag and not travel on the plane with the bag (see appendix 5- *Triple A* regulations). An exception to this is lost luggage, which may be checked in by airline staff, after a thorough security check of the bag. In practice, Lakeland Airways treats such luggage as cargo.
- Passenger lists should not be made available to the public. Nor should such information be made available to any other person or authority, except where legally required to do so, such as Airport Authorities, Security Staff, Customs and Excise Office, Immigration staff, the Police and other such bodies as authorised from time to time by the Chief Security Officer.
- Passengers should not be allowed to take more than one piece of hand luggage on board a plane.
- A passenger should have to check-in only a minimum number of times, i.e. boarding passes for a multi-sector journey should be issued in one go. Under such circumstances, the system indicate that a passenger may have checked-in at a location other than at the airport where the flight is to depart from.
- A record should be retained of the number of bags checked-in by passengers together with an identification number so that lost or unidentified bags can be tracked. All bags must also contain a label indicating the passenger's name and address.
- Where necessary, the despatch controller has permission to remove unaccompanied baggage from the aircraft hold.

The Chief Security Officer has made it clear that there can be no compromise on passenger and flight safety, even at the expense of commercial considerations.

The Chief Security Officer has also recently received notification of changes in legislation. The UK Civil Aviation Authority will require all UK airports and any airline operating in to or out of such an airport to conform to legislation known as *Triple A*. This legislation is officially known as the *Authority and Accountability of Airline Baggage Regulations* and was instituted following an enquiry after the Lockerbie airline bombing.

Airport Requirements

All airports will be required to X-ray screen all intercontinental baggage prior to aircraft loading. In addition, a minimum of 1 in 10 bags must be screened, on a random basis, for UK domestic and European flights.

Appropriate areas must be created within the airport to permit the screening and opening and searching of baggage where the X ray pictures show unidentifiable objects.

Passengers will not be required to be with their baggage during searching where requirements state all bags are to be screened.

Airline Requirements

Airlines will be given the responsibility of ensuring that:

- a. all bags checked-in are explicitly labelled and can be accounted against a passenger flying with the airline
- b. only bags with accompanying passengers may be loaded onto an aircraft
- c. procedures are in place to reconcile baggage with passengers.

Previous baggage security was achieved by counting the number of bags checked-in and the number of bags loaded on to an aircraft. Whilst this provided a crude measure of accountability, it does not detect a situation where two bags are transposed between two flights.

The new legislation requires that every bag loaded is explicitly reconciled with the passengers who have actually boarded a flight. Not that checking-in is not sufficient reconciliation, as a passenger might not board a plane.

3.12 Report from the Systems Manager

The systems manager is responsible for the development of all computer-based and manual operations systems within Lakeland Airways. Most of his requirements are covered elsewhere in the various managers' reports. However, the systems manager has one particular need- that irrespective of the prototype system developed, there must be a capability of interfacing with other computer reservation systems. In particular, it must allow ticket sales to be imported from other systems and logged in the Lakeland Airways system. It must also allow a record of check-ins to be made, together with all appropriate information, by another system and these details also imported to the Lakeland Airways CRS.

The systems manager has reported that a number of standard programs can be made available for use in the development of the prototype system.

A set of data files is also available. It should be noted that the *flight-reference* number assigned to flights in the master timetable file has no meaning outside the IT department and should not be confused with the flight number (e.g. LA001), which does conform to internationally accepted standards. The Systems Manager does not want this number to be used outside the IT department and certainly never on any computer-user interface.

Equipment at remote airports is regarded as being very basic and only a very limited set of screen handling capabilities is possible. Therefore, the systems manager has arranged for a set of screen handling routines to be written which are capable of performing screen handling activities on any equipment at a remote airport. At local airports and in management offices, IBM PS/2 workstations are available. These workstations are also available in ticket sales offices at remote airports.

Check-in staff, the despatch controller and baggage loaders all have access to terminals at their place of work. With the exception of the baggage handlers, each terminal has a printer attached for the listing of system reports.

All terminals are in secure areas and are enabled by a physical key. However, some concerned has been expressed by unauthorised access to the airline's computers using dial-in modems and therefore built-in software security features are deemed desirable.

3.13 Report from the Internal Auditor

The Internal Audit department has been consulted about proposed ticket sales administration systems and points out that the department, as well as the company's external auditors will require a complete list of all transactions by the airline's ticket agents so that they can verify agents' returns with actual ticket issues and revenue passed to the airline.

3.14 Report from the Chief Executive

The Chief Executive has the following additional requirements:

- a. The airline carries a number of VIPs (very important people) who, for a variety of reasons, such as security, loyalty etc. must have privacy on their flight. Therefore seats around and adjacent to those people must be kept free on a flight. Normally, passengers requiring security will have nobody outside their party in the rows behind or in front of them or in the same row.
- b. The airline also wishes to recognise CIPs (commercially important people). Such people are frequent and loyal users of the airline and whose constant use of the airline keeps it in business. Therefore the Chief Executive wishes to give members of the frequent flier scheme and executive club special treatment as follows:

- i. when a flight is full, CIPs are the first to be upgraded and/ or given a seat in preference to others
- ii. when given a seat- provided they are travelling first or business class, no other passenger is placed in their seat row, until the aircraft fills- in which case the most adjacent seat is left free until the aircraft is completely filled.
- c. In the past, the airline has offered discounted tickets to MPs, since these people make important decisions which affect the airline. 65% discounted is given on first class fares are 45% on business class fares. Tickets are issued with a standard ticket basis, with the suffix MP, thus a C class ticket would be CMP.

The airline has been a supporter of the current government and has always had a very close relationship with senior aviation and transport ministers. However, following the liberalisation of take-off and landing slots at London Heathrow airport, enabling foreign airlines greater access to Heathrow without reciprocal arrangements for UK airlines (including Lakeland Airways), the Chief Executive had a major argument with the Secretary of State for Trade and Industry. The result is that Lakeland Airways no longer makes political donations to the government party and has withdrawn discounted seats for MPs.

- d. The information about frequent fliers and executive club members is vital to the success of the business and should not therefore be made available to outside contractors.

The Chief Executive has also expressed his concern at the high cost of keeping aircraft waiting prior to departure, as passengers are loaded, baggage checked and the various paperwork completed by the despatch controller. He is anxious to see how this time could be reduced- possibly by even removing some of the checks.

Appendix 1: Flight Timetable

Introduction

The following pages show a sample of the published Lakeland Airways public timetable. The data is organised by departure airport and shows the flights from the departure airport to each destination served from that point. Each flight is described by one line of data as follows:

| From Athens (ATH) To Manchester (MAN) | | | | |
|------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| -2---67 | 15.30 | 18.20 | LA034 | 737/CM |
| 1234567 | 18.45 | 21.10 | LA032 | 757/CM |

The first column shows the day a flight operates using the following codes:

1: Monday
2: Tuesday

7: Sunday

The next two columns show the departure and arrival times (local times), followed by the flight number.

The final column shows the aircraft type operating the flight and class:

737: a 737 aircraft
747: a 747 aircraft
757: a 757 aircraft
ATP: an ATP aircraft

and for class codes:

F: first class
C: business class
M: economy class.

Sample of the Published Timetable

| From Athens (ATH) To Manchester (MAN) | | | | |
|------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| -2--67 | 15.30 | 18.20 | LA034 | 737/CM |
| 1234567 | 18.45 | 21.10 | LA032 | 757/CM |

| From Barrow-in-Furness (BAR) To Brussels (BRU) | | | | |
|---------------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| 12345-- | 07.00 | 11.30 | LA424 | 737/CM |
| To Cambridge (CAM) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 12345-- | 12.00 | 13.00 | LA504 | ATP/M |
| To Paris (CDG) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 12345-- | 07.00 | 09.15 | LA401 | 737/CM |
| To Exeter (EXE) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 12345-- | 15.45 | 17.15 | LA506 | ATP/M |
| To Manchester (MAN) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 12345-7 | 06.45 | 07.25 | LA302 | ATP/M |
| 1234567 | 07.45 | 08.25 | LA304 | ATP/M |
| 12345-- | 09.45 | 10.25 | LA306 | ATP/M |
| 1234567 | 11.45 | 12.25 | LA308 | ATP/M |
| 1--567 | 13.45 | 14.25 | LA310 | ATP/M |
| 123456- | 15.45 | 16.25 | LA312 | ATP/M |
| 12345-7 | 17.45 | 18.25 | LA314 | ATP/M |

| 1234567 | 20.45 | 21.25 | LA316 | ATP/M |
|-----------------|--------|--------|--------|-----------|
| To Naples (NAP) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| ---67 | 09.00 | 12.30 | LA413 | 737/CM |
| To Berlin (TXL) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 1234567 | 16.40 | 18.50 | LA431 | 737/CM |

| From Belfast International (BFS) To Manchester (MAN) | | | | |
|---------------------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| 1234567 | 07.15 | 08.05 | LA322 | ATP/M |
| 123456- | 11.15 | 12.05 | LA324 | ATP/M |
| 123456- | 16.15 | 17.05 | LA326 | ATP/M |
| 1234567 | 20.15 | 21.05 | LA328 | ATP/M |

| From Brussels (BRU) To Barrow-in-Furness (BAR) | | | | |
|---------------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| 12345-- | 07.00 | 14.45 | LA427 | 737/CM |
| To Manchester (MAN) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 123456- | 10.00 | 10.00 | LA045 | 737/CM |
| 12345-7 | 14.10 | 14.15 | LA047 | 737/CM |
| 1234567 | 20.15 | 20.20 | LA049 | 737/CM |

| From Cambridge (CAM) To Barrow-in-Furness (BAR) | | | | |
|----------------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| 12345-- | 14.00 | 15.00 | LA505 | ATP/M |
| To London Gatwick (LGW) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 12345-7 | 07.00 | 07.45 | LA501 | ATP/M |
| To Manchester (MAN) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 123456- | 10.30 | 11.25 | LA331 | ATP/M |
| 12345-- | 18.30 | 19.25 | LA333 | ATP/M |

| From Paris (CDG) To Barrow-in-Furness (BAR) | | | | |
|------------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| 12345-- | 10.15 | 10.30 | LA402 | 737/CM |
| To Manchester (MAN) | | | | |
| | Depart | Arrive | Flight | Air/Class |
| 123456- | 07.00 | 07.00 | LA060 | 737/CM |
| 123456- | 09.50 | 09.50 | LA062 | 737/CM |
| 12345-7 | 13.50 | 13.50 | LA064 | 737/CM |
| 123456- | 17.50 | 17.50 | LA066 | 737/CM |
| ---5-7 | 18.50 | 18.50 | LA071 | 737/CM |
| 1234567 | 19.50 | 19.50 | LA068 | 737/CM |

| From Copenhagen (COP) To Manchester (MAN) | | | | |
|----------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| 123456- | 12.00 | 12.30 | LA075 | 737/CM |
| 12345-7 | 20.00 | 20.30 | LA077 | 737/CM |

| From Exeter (EXE) To Barrow-in-Furness (BAR) | | | | |
|-------------------------------------------------|--------|--------|--------|-----------|
| | Depart | Arrive | Flight | Air/Class |
| 12345-- | 09.45 | 11.15 | LA503 | ATP/M |

Appendix 2: Project Guide

1. Preparation

- Agree group organisation
 - Time and place of normal meetings
 - Assign group roles
 - Exchange contact information

2. Information Gathering

- Establish scope and general purpose of system
- Identify initial organisational units and stakeholders
- Establish goal hierarchy
- Identify problems
 - Identify problems using techniques such as brainstorming or cause-effect diagrams
 - Cross-reference problems to stakeholders
 - Identify any constraints within which a new system must operate
- Identify requirements
 - Identify functional requirements and cross-reference them to problems
 - Identify non-functional requirements (based upon general constraints and stakeholder expectations)
- Prioritise requirements
- Identify system components
 - Identify objects
 - Identify candidate processes
 - Cross-reference objects and processes
 - Cross-reference processes and requirements
- Identify events
 - Identify candidate events
 - Validate objects by creating object life histories using candidate events

3. Use Case and Class Modelling

- Establish requirements expressed in Use Case format
 - What are the basic systems/ subsystems?
 - Describe each system/subsystem
 - Define the basic Use cases
 - Who are the actors?
 - What are the Use cases?
 - Is there any optional functionality in each Use case (<<extend>>)?
 - Is there any common functionality in each Use case which can be factored out into a separate Use case (<<include>>)?
 - Detail the Use cases
 - Script each Use case using an appropriate notation (structured English, decision trees, decision tables)
- Establish basic class structure
 - Identify candidate classes from object list
 - Ensure names are singular
 - Define attributes
 - Define domain for each attribute

Determine whether attribute has good reason to be 'public'

Create data definitions for attributes where they are complex structures

Check whether any attributes are 'hiding' classes

Establish associations between classes

Add named associations (both directions)

Add cardinality in both directions

Check any associations with 1..1 cardinality (0..1 or 1..1 in both directions) and collapse any associations

with M..N cardinality (0..* or 1..* in both directions) and decompose

Add behavioural characteristics to classes

Add operations to each class

Create sequence diagrams for important Use cases

4. Refining and Validating Classes

- Refine class structure to include aggregation
 - Consider structure of each class- is it made up from parts?
 - Are there associations with names such as 'is part of', 'has part', 'has' etc.?
- Refine class structure for specialisation/generalisation
 - Identify sub-classes or specialisations
 - Identify any multiple inheritance
 - Identify additional attributes and operations of sub-classes
 - Redefine operations where different implementation is required
- Validate class model
 - Validate attributes in each class
 - Create functional dependency diagrams
 - Ensure class attributes are in 3NF
 - Validate behaviour for each class
 - Create an object life history ensuring no interleaved events (if so, create a new class)
 - Create state-transition diagrams for significant behavioural aspects

5. Maintainability and Reusability

- Review class design
 - Review coupling
 - Identify and assess any message passthrough
 - Minimise other unnecessary forms of coupling
 - Review cohesion
 - Check operational cohesion
 - Calculate McCabe metrics for complex processing
 - Check generalisation cohesion and opportunities for multiple inheritance
 - Assess reuse potential
 - Can classes be made more general and reusable?

6. System Implementation

Enhance class structure with separation of concerns

Introduce boundary and control objects

Restructure sequence diagrams to separate concerns

Design screen layouts for boundary objects

Specify state-transition diagrams for complex interactions

Design system architecture

Define components

Define nodes

7. Ensuring Quality

Define testing strategy of system

Identify documentation required

Identify training needs

Identify other infrastructure and support services

8. Business Case

Prepare business case

Key problems and requirements

Key system features

Advantages

9. Prepare Presentation

Agree key presentation points

Prepare outline presentation

Prepare detailed presentation, including slides

Rehearse presentation

10. Prepare Documentation

Check models, diagrams etc.

Prepare narrative for reports

Package

Copy reports

Sign cover sheet

Appendix 3: Submission

The submission should consist of two documents:

Business Case

The aim of the business case is to provide a brief summary of the overall aim of the proposed system and explain how it will assist Lakeland Airways in the operation of their business.

It is important that the business case focuses upon the operation of the airline and how it can be improved, rather than on a technical description of the proposed system (this appears in the system specification).

The document should be structured in terms of the functional and operational units of the airline and not in terms of system functions, highlighting the following points (maximum 10 pages):

- management summary (maximum of 1 side)
- background
- assumptions made
- system aims and objectives
- operational characteristics of the system
- benefits of the system to operational units
- costs of the system in terms of the changes that Lakeland will have to make to the way it operates its business (you do NOT have to estimate the costs of producing the proposed software)
- likely effect of the system on the future operations of the airline
- recommendations about the proposed system.

System Specification

The aim of the system specification is to provide a detailed, technical view of the proposed system. It should include the following sections:

- management summary- summarising the content of the document (maximum of 1 side)
- aims and objectives of the proposed system
- outline of the analysis conducted- who are the perceived system users, what are their jobs, what constraints must the system operation within
- system function hierarchy and function description
- fact lists (problems, requirements, objects, events, processes etc.)
- use cases
- object class model
- sequence diagrams for key processes
- state diagrams for key object classes
- summary and conclusions.

The length of the system specification will largely be determined by the size of the models and diagrams.

Submission

A single submission should be made by your group, with a standard front cover signed by all group members.

Appendix 4: Presentation

Overall Objective

The system specification document which you will be producing outlines your perception of the system's requirements and how those requirements might be embodied in an operational system. A system specification does not however give any justification as to why you have constructed the system in the way you have chosen. It provides no rationale or explanation of alternatives and the choices you have made. Therefore the objective of the project presentation is to provide such an explanation of choices. It is not intended simply to repeat the contents of the system specification.

The aim of the presentation is:

- to provide an outline of the business case for your project and a summary of its initial specification
- to outline those requirements or functions which have been rejected from your specification
- to provide the assessors with a statement of the progress of your project
- to practice the giving of a presentation.

You may assume that the audience which you will be addressing are managers from various departments of the airline (marketing, security, sales, ticket agents, despatch, cabin services, planning, pilots etc.)

Presentation Outline

The interim presentation should include the following points- although not necessarily in this order or as explicitly as this:

- introduction
- background to the project
- description of the analysis carried out
- summary of the information needs of the business and current system
- objectives of the new system, including rejected objectives
- summary of the main objects, process and events within the system
- constraints to be imposed upon the system
- presentation of the main system models, high-lighting significant points of interest
- outline of the implementation plan
- benefits of the proposed system to the business
- outline of costs and overheads of the proposed system
- any other factors significant to the choice of specification.

It is important to note that a restatement of the system specification document or business case is NOT required. It is better to think of the specification in terms of linking the business case with the system specification.

Presentation Preparation

Number of Speakers

Whilst all members of your group are expected to attend the presentation, it is not essential that all group members take part in the formal part of the presentation. It is suggested that you limit the number of presenters to 2

people. Other members of the group will, of course, assist in the presentation preparation and will be expected to answer questions from the presentation assessors.

Data Projector and Slide Preparation

A PC with a data projector will be available for use, as all presentations must be prepared in PowerPoint. You can use diagrams and other auxiliary material but you should keep your presentations simple as the maximum time available cannot be exceeded.

Ensure that you use slides to aid your presentation. Slides should only contain summary points and not the detail of your talk. Reading out aloud what is already on a slide is boring for the listener and a waste of a slide. Ensure that each of the main points you are going to make appears on a slide.

Note Preparation

Everybody has their own style of preparing notes for a presentation- memory cards, written notes, heading lists etc. Generally, it is better to avoid writing out your presentation in long-hand and reading it out. Whatever method you choose, make sure that you know exactly what you want to say.

Trial Run

The quality of a presentation will always depend upon the extent to which you have practised your presentation. The more you practice the presentation, the more confident you will become. Try to practice your presentation so that you can actually give it without the notes you have made. This will enable you to give a more natural and uninterrupted presentation. Also, if you lose your place in your notes, you should be able to continue. Make sure that the length of presentation does not exceed the time permitted. Remember it always takes longer to give a presentation on the day, than it does in a trial run.

Giving the Presentation

Arrive at the venue for the presentation with plenty of time to spare, lay out your notes check that the data projector is focused and ready for use and that everything is fine regarding your PowerPoint file which should be stored in a floppy.

Make sure that you place your notes so that they are easily accessible during the presentation. Find a position to stand and give your presentation so that you do not obstruct the view of your listeners.

Make sure that you stick to your notes and **do not add in extra things which you suddenly remember during the course of the presentation!** This is always disastrous and leads to problems.

At the end, thank the audience for their attention and ask if there are any questions.

Further Assistance

For further assistance on making a presentation, see the module web site at: www.co.umist.ac.uk/CT203.

Appendix 5: Sample Project Minutes

The following is an example of a set of project minutes, which should be recorded for each of the main group meetings.

Minutes of Meeting of Group 17

Held on Monday 21st October

Present: Jack Straw, Tony Blair, Ian Duncan Smith, Ken Clarke, Gordon Brown

Apologies: John Major

17/25 Review of Previous Actions

- a. A22- TB reported that he could not complete the data dictionary as he was still waiting for JM to complete the ER model.

Action A29 (JM)- complete ER model and pass to TB no later than 23rd October

- b. A27- GB has produced DFD for process 2.1 but felt that this needed a final review by the group before signing-off.
- c. All other actions complete.

17/26 Report on Work-in-Progress

- a. JS and TB reported that process 3 specification would be completed next week. Requires process 4 to define interfaces to allow full validation.

Action A30- KC and JM define interface to process 4 and pass to JS and TB. Due: 24th October.

- b. KC and JM could not understand the requirements of the planning manager with respect to QIS fares. Nobody else could either. Documentation seemed inadequate.

It was agreed to define CUSTOMER as somebody who actually purchased the airline ticket, but did not necessarily travel.

Action A31- KC to raise issue with PJJ at next project management meeting.

- c. IDS and GB reported work on process 1 completed.

Action A33- All to review process 1 at next meeting.

17/27 Review Against Schedule

It was agreed that the schedule had started to slip due to JM's absence for the past 2 weeks. As a contingency, work would not begin on process 5 until it was clear that there would be sufficient time to complete.

Action A34- KC to speak to PJJ about problems with group. In meantime, TB is to speak with JM to see what the problem was.

17/28 Project Planning

- a. It was agreed that work would continue as planned for the coming week, except process 5.
- b. In preparation for the presentation, it would be necessary to check out projection facilities and decide on number of slides desirable in time available.

Action A35- TB to contact Peter Mandelson to check best style of presentation.

17/29 Date of Next Meetings

In addition to weekly meetings with PJJ, it was agreed to have an additional weekly meeting at TB's house, 10 Downing Street, on Thursday's at 10.30am, starting next week.