at the gate who inserts the ATB into another special reader that retains one part for the airline's revenue accounting purposes and returns the other portion to the passenger as the passenger's boarding card.

5. Meanwhile, the airline in whose system the reservation was made and that produced the passenger's ATB, reports the ticket details direct to BSP, electronically. This saves the agent from having to batch and submit physical ticket stubs manually.

The advantages to the airline of the ATB over the OPTAT ticket are fairly obvious. They allow the airline to mechanize its flight departure operations to a far greater extent than ever before. But there are important advantages to the travel agent as well. Avoiding the BSP batching and reporting task is perhaps the greatest advantage. Then there is the satellite ticketing advantages as described in the following section, as well. Finally, the customer even benefits because using an ATB will mean a faster transit through the airport and onto the flight.

Electronic ticketing

Electronic ticketing, or e-ticketing as it is commonly referred to, eliminates the need for paper tickets. Instead of a ticket being printed and the various copies processed by the agent, the passenger, the airline and BSP, an electronic image of the ticket is used to control flight boarding, settlement and revenue accounting. E-ticketing is possibly one of the most significant developments within the field of travel automation. Not simply because it makes life easier for the airlines but because it has far reaching implications for new electronic distribution systems like those based on the Internet. So, before we can explore these implications and consider the new systems that are beginning to surface, it is important that you grasp some of the fundamentals of e-ticketing.

E-ticketing has been in widespread use in the USA for some time. However, in Europe, it is in the early stages of roll-out. Scandinavian Airlines System (SAS) and Lufthansa were two of the first European airlines to introduce e-ticketing; and in the UK, ticketless travel is supported by British Airways and British Midland. It is important to realize that e-ticketing is a CRS supported function that can be used to book: (a) airline seats sold directly to customers by the carriers themselves, and (b) airline seats sold to customers via travel agents. Travel agents obtain e-ticketing functions via their GDSs, which are of course connected to the airline's CRS. So, for e-ticketing to be possible from a technical standpoint the airline's CRS and the travel agent's GDS must both support e-ticketing functions. Take, for example, the domestic air travel business of British Airways in its home market – the UK.

British Airways e-ticketing

British Airways piloted its e-ticketing system on the Gatwick to Aberdeen route for a period of six months. The pilot trial was judged to be very successful and as a result, BA together with most of its franchised carriers, introduced e-ticketing on all UK domestic routes on 12 March 1997. By early 1997 BA was carrying around 3,000 ticketless travellers per day. Also during this year certain travel agents could use Galileo or BA Link (British Airways' own viewdata system), to interactively book e-tickets. Agents using other GDSs could issue BA e-tickets, but only by queuing them to the BA system, just like a ticket on departure. However, all GDSs have plans to add e-ticket functionality within the UK very soon.

British Airways e-ticketing via Galileo travel agents

Travel agents in the UK can use the Galileo GDS to issue e-tickets on British Airways domestic routes. The principal way that this is accomplished is via the various Galileo PC workstation products. The following section therefore explores in more detail, how BA e-tickets are issued by travel agents using the Galileo GDS. Before we begin, there are certain conditions that must exist before an e-ticket can be issued:

- **E-ticket requirements** The standard ticketing process commences when three basic conditions have been met: (i) a reservation has been made for an airline seat, usually via a GDS; (ii) payment for the ticket has been received

by a travel agent or other intermediary; and (iii) the departure time is imminent. For e-ticketing to take place, however, there are a couple of additional conditions. First of all, the ticketing carrier must support e-ticketing on the customer's route, as booked. This is usually denoted by an 'E' on a GDS availability display. Second, the customer must have some form of plastic card that will enable them to use the self-service check-in machines at the airport (more on this later). For British Airways this may be either an Executive Club membership card or an E-ticket Access card. However, not all customers of the travel agency will necessarily possess an Executive Club card. In such cases the travel agent simply issues an E-ticket Access card from a stock supplied by British Airways (supplies of E-ticket Access cards may be obtained by the travel agent by telephoning a special British Airways hot-line). This enables an E-ticket Access card to be issued to a customer prior to commencement of their journey. Finally, it is necessary for the customer's card number to be present within their booked PNR.

- **E-ticket issue** Once these conditions have been met, the travel agent makes a simple entry on the GDS terminal that initiates the issuance of an e-ticket (incidentally, if the travel agent does not use a GDS, the agent can still request the booking source – usually the agent's airline reservations office – to e-ticket on the agent's behalf). Instead of a physical ticket being printed within the travel agency, an electronic image of the ticket is created within the ticketing carrier's system. This is really no more than a data record containing all the items shown on a physical paper ticket, plus a few extra fields. The e-ticket image will even contain a ticket number, just like a standard paper ticket. This ticket number, which is prefixed with the airline's unique three digit code, is used for accounting and reporting purposes in the usual way (see BSP in Chapter 7).
- **Other documentation** The only remaining piece of paper that must still be handed to the customer is that stating the terms and conditions of carriage, otherwise known as an airline passenger notice (APN). These terms and conditions were originally agreed by all the airlines at a convention held in Warsaw many years ago. They must be given to the customer by the agent prior to departure. This is not normally a problem because there are usually several other items of paper also given to the customer at this time. For example, the itinerary, luggage tags, hotel vouchers and information leaflets provided by the travel agent. At least one of the information leaflets given to the customer will explain how they should check-in when they arrive at the airport.
- **Self-service check-in** Checking-in with e-ticket is quicker and easier for passengers when they arrive at the airport terminal, than with conventional paper tickets. The whole process takes only a few minutes and is controlled by self-service machines that resemble ATM cash dispensers but which use efficient touch screen technology. These machines are usually located near to both the drop-off zone and the terminal concourse, often within their own area designated as a self-service check-in lobby. They accept passengers holding either an ATB or an e-ticket. (For an ATB ticket holder, the customer inserts a cardboard ticket – the machine then prints a few additional fields and electronically converts the ATB into a boarding pass.)

  E-ticket holders first insert their E-ticket Access card or Executive Club card into the self-service check-in machine. The traveller's card is validated by the British Airways system controlling the self-service machine. The system will check the number on the card against the number that has previously been entered into the PNR by the travel agent at the time of booking. Should a traveller have more than one e-ticket for travel on the day of check-in, the self-service machine will show a list from which the traveller selects the appropriate one. The flight details are then displayed along with the seat number originally allocated as part of the booking process. The traveller then has several options: either

  1. Retrieve the card and a boarding pass, which is automatically printed by the machine. The passenger may then proceed straight to the departure gate and board the flight.

2. Change the pre-allocated seat, i.e. the one originally assigned to them by the travel agent. This is done by viewing a seat plan and choosing another available seat on the aircraft.
3. Choose to receive a boarding pass for both the outward and return journey, provided the passenger is returning within 24 hours of departure.
4. Print another copy of the e-ticket itinerary and retrieve this from the machine along with the boarding pass.

- **Departure** Having done this, the traveller proceeds to the departure gate, boards the flight and departs. This can be a very speedy process for passengers with just carry-on luggage. However, if the passenger has baggage that needs to be carried in the aircraft's hold, then the passenger must still queue up at the manual check-in counter, hand over the baggage and collect a baggage check.
- **Settlement and accounting** In terms of the settlement process, e-ticketing allows settlement to be effected by current BSP processes. These systems had to be modified slightly in order to support e-ticketing, although this work has now been completed as far as the UK's BSP is concerned. For example, the most obvious modification was that the ticket image passed by GDSs into the BSP systems had to possess a special indicator designating it as an electronic ticket for which there was no paper equivalent. A similar identification had also to be present for refunds. In fact, many GDSs have already built automated e-ticketing refund processing into their back-end systems. Otherwise, e-ticketing from a sales reporting and settlement perspective is fairly straightforward. The processes involved are not significantly different from those used for paper tickets (see Chapter 7 for a description of BSP).

Finally, let's briefly consider the situation where BA customers book their flights directly, for example, via a BA telephone sales unit. These customers have not had any contact with a travel agent. However, they can still use the self-service devices at the departure airport to: (a) collect their travel documents as described above, and (b) pay for their tickets using their plastic cards.

E-ticket benefits and the future

E-ticketing offers many potential benefits to travellers, travel agents and the airlines. It cuts down on paper processing, eliminates the 'I've lost my ticket' problem, allows last minute changes, i.e. right up to 30 minutes prior to check-in, eliminates the need for TODs, simplifies the refund process and even has indirect benefit to airports in terms of easing congestion at check-in desks. Looking to the future, e-ticketing holds the promise of delivering vast improvements in the quality and level of management information available to airline customers. However, e-ticketing does require a fair investment of resources of airlines. For a start there is the construction and operation of the self-service check-in machines and lobbies. But more importantly perhaps, there is the investment needed to enhance the airline and GDS systems to support e-ticketing.

While this may not be quite so challenging for an airline's domestic routes, a whole new dimension of complexity is introduced when international routes are considered for e-ticketing. The reason for this is the existence of inter-lining agreements that airlines have negotiated with each other. What happens, for example, when a passenger on an overseas journey 'holding' an e-ticket wishes to change their flight for another airline that does not support e-ticketing? The administrative complexities and opportunities for endless bureaucracy are substantial. So, e-ticketing will no doubt come to pass, certainly for many domestic routes and even for flights within the EC. However, its widespread use around the globe may have to wait a few years. This is why for the moment, e-ticketing is only possible in the UK for BA customers with less than four sectors, none of which may be international flights or flights involving other carriers. Some of the other major issues that e-ticketing faces are as follows:

- **Commission levels** Many airlines claim, quite justifiably, that e-ticketing reduces the amount of work that a travel agent needs to do, e.g. print the ticket and process the ensuing settlement. It has been estimated, for example, that issuing an e-ticket takes an agent 20 per cent less time, compared with issuing a conventional ticket. Airlines are therefore cutting, or at least

discussing the possibility of cutting, agents' commission levels, e.g. SAS and Lufthansa have already reduced the commission on domestic e-tickets to 5 per cent.

- **Direct sales** Some travel agents suspect airlines of trying to use self-service ATM ticketing machines to build a customer prospect data base and then to use this to solicit these customers for new business. Although most airlines deny this, it is no doubt an issue that will only be resolved over the long term as new distribution channels evolve (see Chapter 5 for a discussion of disintermediation).
- **Legal issues** Will the terms and conditions of flight, as agreed at the Warsaw convention be communicated to passengers effectively? Because this will only be a separate piece of paper and not an integral part of the ticket as is currently the case, will travel agents always remember to give this to their customers and will passengers pay any attention to it?
- **Customer acceptance** Some customers will always feel more secure with a piece of paper and may in fact demand that their travel agent produces one for them.
- **Airport security** There remain many airports around the world where people are not allowed to pass into the 'air side' of the terminal unless they hold a valid ticket. The location of the self-service check-in lobby is therefore a critical issue for airlines. In most cases they will therefore need to be installed on the concourse before airport security.
- **Interlining** This refers to the flexibility currently enjoyed by passengers using airlines that have an Interline agreement. Such agreements allow a passenger to travel on another airline instead of the one shown on the ticket. The problem is that in order for this to be effected, the validating airline needs a copy of the ticket in order to prove that the passenger has the right to travel on their airline.
- **Shared check-in machines** At present each airline that supports e-ticketing in a country needs to install their own self-service device within the airline terminal. In the UK, British Airways has already done this and British Midland is thought to be planning to install similar equipment. How long will it be before airlines start sharing each other's self-service machines? This would make a lot of sense from a cost angle and from a logistics angle, i.e. in other words it could save a plethora of different and incompatible self-service devices from being installed in UK airports.

It is estimated that 20 airlines that participate in the UK's BSP will move to e-ticketing over the next seven to ten years. These airlines have the required level of in-house technology to make e-ticketing a practical reality; and because these airlines tend to be the larger ones, it is not surprising that they represent about 60 per cent of the UK BSP's ticket volume. Looking this far ahead, it is also possible to forecast e-ticketing for non-air carriers. However, despite these glimpses of a paper-less future, it is highly likely that travel agents will always need to keep a stock of hard-copy airline tickets for certain situations.

Satellite ticket printing

A type of printing of tickets, invoices and itineraries that is frequently used to service large business travel customers is known as satellite ticket printing (STP). It allows a small inplant location to produce airline travel documents without the need for travel agent workstations.

STP works like this. First, the central travel agency must have a fully functional reservations terminal and a data line connected by a communications controller to the remote inplant location. Then the inplant must have at least one printer that is connected via its own communications controller to the central travel agency site. It is usually best for the inplant to have three printers: one for airline tickets, one for itineraries and a third for hard copy. It is then possible for reservations made by the central travel agency location to be channelled to the inplant for document production, Because the inplant is usually situated right on the customer's premises a very speedy service can be provided.

It is important to remember, however, that the remote inplant location must obey all the relevant IATA rules for the holding of airline ticket stock. This includes, for example, the need for a safe on-site in which to store the blank tickets, fully trained staff and adequate security arrangements. In other

words the inplant must hold a full IATA licence. If, however, the remote location is using an ATB printer and ticket stock then the process is a lot simpler. With ATBs, only the passenger's ticket need be printed remotely. The other parts of the ticket for the agent's files, for example, can be directed to a printer at the agency's main office. This does away with the need to have specially trained staff at the remote satellite location who know how to process the various copies of the traditional OPTAT stock. The net result is lower operating costs for the agent and a speedier service for the customer. STP is also available on a European-wide basis. For more information on Euro-STP, please refer to the section on BSP contained in Chapter 7.

Intelligent ticketing

There is little doubt that an industry standard for the electronic encoding of travel ticket media is long overdue. The Association of European Airlines (AEA) recognized this in 1996 and instituted a study of the possibilities and feasibility of establishing standards for a common ticket that could be used for several different forms of transport. Given the appropriate standards, a single multi-modal ticket could be used by a traveller, for example, to fly from Madrid to London, stay overnight in the city and then catch the Eurostar train to Paris. Or by a transatlantic passenger arriving at London Gatwick and using the shuttle train to Victoria station in London. There are even better examples of how a single multi-modal ticket could be used in Scandinavia to travel between bordering countries by air, rail and, especially, ferry. A multi-modal ticket with data recorded on it either in the form of a magnetic strip or an embedded chip, would enable the passenger to pass through machine-controlled gates and obtain boarding passes for travel.

Unfortunately, the AEA study was terminated, mainly because there was insufficient commitment on the part of some leading travel suppliers but also because the rate of change in the industry is so rapid. In such a turbulent environment, who is going to try and 'put a stake in the ground' and commit to a set of standards for a media that may no longer exist in the next few years? Then of course there are the inevitable competitive issues. This is especially true now that rail services compete so directly with airlines between, for example, London, Paris and Brussels. To illustrate this, the new cross channel rail services have taken between 20 per cent and 30 per cent of the market on these routes, from the airlines. In any event, many rail companies are embroiled in developing their own set of standards based on the ATB. Their objectives are to allow travel agents to produce rail tickets from the same printers that they currently use to produce airline tickets. Finally, there is e-ticketing, which threatens all forms of paper-based tickets in the longer term. If e-ticketing becomes truly widespread then physical airline tickets could become a thing of the past. Consequently, the intelligent ticketing project never really got off the ground.

Smart cards

Despite its demise, the goals of the intelligent ticketing project live on in the form of smart card technology. Indeed, many of the standardization objectives of intelligent ticketing are as relevant to this rapidly evolving area as before. A smart card is simply a plastic card in which a miniature computer processor chip with its own memory, is embedded. The smart card can be read and/or updated either: (i) by passing it through a swipe device just like a normal plastic card, (ii) by inserting it into a socket with pin connectors, or (iii) by its proximity to a remote reader/processor. Smart cards could solve the problems that intelligent ticketing sought to address. They could also help support the spread of e-ticketing and some of the new travel distribution technologies, many of which are explored in this book. Evidence of the potential opportunities that are offered by smart cards may be drawn from several industry wide experiments currently taking place. For example, the experiment that IBM, American Express, American Airlines and Hilton are undertaking. This aims to test the ability of a general purpose smart card that could, in the first instance, be used primarily for business travel.

It is interesting to speculate how travellers would be affected by smart card based services, in the future. One possible way is for the service to

be based on an Internet site sponsored by either a GDS, a card issuer or even a joint venture between two or more travel and financial institutions. Customers of the service provider would be issued with smart cards that would be registered uniquely in their name. The customer wishing to embark on a trip could, for instance, connect to the Internet, sign-in to the site supporting the smart card application and then link to a GDS booking engine. A booking could be made in the GDS and the booking record downloaded for storage in the computer chip embedded in the customer's card. Downloading could be accomplished either by means of a specially adapted telephone or by a smart card reader device attached to the customer's PC. Then, with special smart card readers installed in airports, hotels, rail stations, retail outlets, ATMs and other locations, the smart card could be used to:

- Register at the airport terminal for e-ticket processing and boarding pass collection.
- Check-in at a hotel by using a self-service ATM type device to select a room and obtain an electronic room key.
- Check-out of the hotel via the self-service machine without needing to queue at the hotel's check-out desk.
- Swipe the card through rail ticket barriers to board a train.
- Obtain cash more securely from ATMs by using the intelligent authentication features of the smart card.
- Spend electronic cash by using the stored value features made possible by smart cards, at designated retail outlets adapted for this purpose, e.g. the Mondex experiment undertaken in Swindon, UK.
- Purchase goods, services, restaurant meals, fuel and other retail items, using the enhanced point-of-sale authentication and credit limit monitoring features of the smart card. This could use local card chip processing to authenticate items under a certain value with on-line authorization being required only for purchases exceeding an upper threshold, depending upon the card holder's personal profile as set by the card issuer. This could dramatically reduce the amount of on-line traffic, and therefore cost, that card issuers incur to run real-time authorization systems.
- Store personal health data in the card for use while travelling.
- Record loyalty reward points (this is already being done by a leading German airline).
- Store a full transaction profile of the card holder that would enable: (i) the card holder's travel and financial services to be finely tuned to meet their specific personal requirements, and (ii) allow suppliers to carry out some very highly targeted marketing aimed directly at the individual.

There are many more uses for smart cards but there are also a number of issues that will need resolution before much progress can be made in this area. One significant issue is the opportunities that smart cards offer to reduce the amount of fraud that is currently experienced with magnetic strip based plastic cards. It has been said that these cards have been severely compromised through counterfeiting. Interestingly, the introduction of smart cards in France has seen the level of fraud decrease substantially. This is achieved through improved authentication methods at the point-of-sale, built-in credit control and a higher barrier to counterfeiting. The ability of the smart card to be updated as it passes through the travel consumption chain is also a factor that helps reduce fraud and enhance service levels.

While it is true that the magnetic strip encoded onto ATBs can also be updated as travellers are processed through airline check-in desks, there are constraints on the future use of this technology, for example: (a) the amount of information stored and updated on an ATB is limited; and (b) the more widespread use of intelligent ATB processing outside of air, rail and ferry services in the future, is unlikely. One of the reasons for this is the cost of the equipment needed at the service point. In fact, the investment in point-of-service processing is probably the primary obstacle to more widespread use of smart cards. In the area of travel, there is no doubt that smart card readers are cheaper than ATB ticket printers. However, in the context of the global retail distribution chain, the travel agency sector is relatively insignificant. Even a comparatively small add-on cost affecting

every point-of-sale till would require a very large investment of capital indeed; and who would pay? The obvious answer is the card issuers, because they stand to gain the most from the consequent reduction in fraud. However, there are many competing arguments on this topic and it is a game that is being played for very high stakes. The dual issues of cost and funding therefore represent the principal barriers facing smart card issuers as they consider the more widespread use of this technology.

Another fundamental issue is whether detailed information is actually stored in the smart card itself or whether the card simply contains a key to information that is held in an external computer system. The GDS booking record or PNR is a particularly good example. From a technical viewpoint, the PNR could be stored completely within the smart card. However, if this is done then a number of related issues arise. For example: 'Who owns the data stored on the smart card?' If it is owned by the airline (or GDS), then could the card issuer process the data, for example, to produce integrated management information for customers? Also, how would the data be synchronized between that stored within the smart card and that stored within the GDS? Airlines sometimes have to change the booking records of their customers to reflect a service change. How would this new information update the travellers booking record if it was stored on their card? An alternative approach is for the smart card to store just the PNR locator that could then be used to retrieve the full booking record from the GDS. However, holding only a key might seriously constrain the opportunities for fully exploiting smart card technology. These are just a few of the reasons why airlines and GDSs are reluctant to give up overall control of the booking information that they store on each of their customers.

There is also the fundamental issue of: 'Who owns the smart card service?' If this is to be the bank card issuers then it will be interesting to see how alliances with airlines, GDSs and other travel suppliers develop. Finally, there is the biggest issue of all – standards. Standards are pivotal to the success of smart cards in travel. Without standards, the uses that I have identified above would not be feasible. Standards that define how the data are recorded within the chip and what form of security and encryption techniques are used. The problem is that these standards need to be agreed throughout the travel and financial services industries and between competitors. A very challenging issue, but one that should not be ruled out as unattainable. After all, when the stakes are high in terms of financial pay-off, there is an enormous drive for standards to be agreed. There are anyway, plenty of examples of intra-industry, intra-competitor collaboration in the standards field, e.g. EDI and the current magnetic strip plastic cards. So, the signs appear to be quite encouraging; and a great deal of groundwork has in fact already been done in establishing basic standards for the multiple use of ATBs, electronic tickets and smart card data storage. Nevertheless, this whole area is one that is rife with issues although at present, i.e. mid 1997, it is also bereft of solutions and definite directions. Smart card technology in travel and tourism will be one to watch over the forthcoming few years.

Hotels

There is little standardization in the area of hotel systems. The kinds of technology used throughout the hospitality industry, while bang up-to-date, vary widely depending upon the size and type of hotel. However, there is a lot going on in the area of IT within the hotel industry. Some of it is in the high profile area of distribution and the Internet is a prime example (see Chapter 5). But hotel back-office systems are becoming increasingly sophisticated and are now widely recognized as being a key to improved profitability; and it doesn't stop there. Guest services are the current focus of attention and there are some really interesting experiments being conducted on a large scale. For example, Hilton, American Express and IBM are jointly exploring the opportunities offered by smart cards. Finally, in-room technology is rapidly becoming a very real competitive differentiator, especially at the top end of the hotel market. So, first of all, let me try and categorize the different ways in which hotels implement their systems. These really fall into three main areas: (a) in-house systems owned and operated by the

hotels themselves, (b) packaged systems that are purchased from software companies, and (c) outsourced systems where a third party will run all or some of a hotel's application functions. Let's take a look at each of these in a little more detail:

- **In-house** Many of the larger hotel chains have managed to develop their own in-house systems over a period of several years. Some of these systems have been purchased from other hotels and even other suppliers in related industries. They have been modified to suit chains' individual needs and have developed into an important operations and distribution capability upon which their businesses have become highly dependent. However, not many hotels develop their own systems these days; it is considered far to risky and expensive a venture, which can detract a hotel from its core business.
- **Packages** Small to medium sized hotels may also develop their own systems but more usually, they purchase a pre-packaged system available from one of the many software companies specializing in the hotel sector. There are now a wide range of packaged systems available to hotels, each providing a specific function. I'll be taking a look at these functions and different types of packaged systems in more detail in a moment.
- **Outsourced** Some hotels find the outsourcing option very worthwhile. There is now a wide choice of different outsourcing options available to suit hotels seeking to automate specific areas of their operation. This can be attractive to smaller hotels that do not wish to invest in running systems themselves.

I am going to concentrate primarily on the packaged and outsourced solutions in the remainder of this section. The reason is that in-house systems are by their very nature unique and therefore not really representative of the industry. It is the packaged and outsourced systems supplied by third parties that are particularly relevant and interesting. The blanket term often used to describe the systems that support hospitality industry automation is a property management system (PMS). However, this terminology has been somewhat abused and there are in fact many more functions that can be automated by specialist application software. Let me put PMSs into context with other systems that are frequently used throughout the hospitality industry:

- **Property management system (PMS)** This is probably a hotel's core system. It maintains all details that describe the hotel, such as the size, type and number of rooms, the rates applicable for rooms and other facilities, and all details concerning guests. It supports guest check-in (also known as front desk support) and check-out functions, which produce guest bills and record payment. At any point in time, the PMS may be used to determine the status of a room, e.g. clean and vacant or not yet made-up. Hotels usually implement their PMS on an in-house computer. That doesn't mean to say they usually have an in-house IT department to support it. Most PMSs are turn-key systems that, as the name implies, are simply turned on and off by hotel staff.
- **Self-service kiosk systems** This is a new area for many hotels and is the subject of much experimentation at present. Self-service kiosks are an attractive way for a hotel to reduce guest check-in and check-out procedures while at the same time reducing the load on the front desk staff. It is, however, widely recognized that self-service kiosks will not be used by all guests. Nevertheless, business travellers who are becoming increasingly computer literate may wish to swipe their cards through a self-service machine, select the check-in menu and then choose their rooms from those currently available. It is quite possible for these self-service kiosks to issue an electronically encoded room 'key' and a printed set of personalized instructions for the guest. If this saves a tired business traveller 15 minutes queuing at the front desk and going through the old familiar check-in question-and-answer session, then the traveller may well prefer the self-service kiosk. Especially if the same kind of time savings can be enjoyed on check-out.
- **Reservation systems** These systems control the forward inventory of hotel rooms. The hotel maintains an inventory of the rooms available using its PMS. This is complemented with

additional information, such as periods when the room or rooms are blocked out as unavailable. The reservation system allows operators, or more generically, users, to allocate a room for a specific period of time to an individual. There are many instances where hotels outsource their reservations function. The reason for this is that reservation systems are expensive. They require non-stop computer systems, on-line applications and plenty of capacity in order to ensure busy times are covered. This all adds up to high operating costs. Sharing these resources with others via an outsourced operation can be attractive to small to medium sized hotels.

- **Point-of-sale systems** These sub-systems comprise payment handling devices that produce bills and accept various financial instruments from guests, e.g. credit cards, cash, guest cards and so on) Depending upon the hotel's size and level of sophistication, these point-of-sale devices are linked by communications lines to a central communications processor that in turn is linked to card authorization systems. The systems also feed transaction data directly into the hotel's accounting system, which is often integrated within the PMS.
- **Food and beverage systems** These systems control the food stock required for the hotel restaurant's various menus. It allows changes in suppliers' prices to be evaluated against projected customer demand for certain menu items and, as a result, enables the restaurant to optimize its order position with alternative food suppliers.
- **Back-office systems** This is the term given to a set of systems that records all transactions, and maintains the hotel's books of account. These systems receive transactions from the other sub-systems, as described here, and compile data on the hotel's expenditure and income. The systems support the purchase ledger, i.e. accounts payable, the sales ledger, i.e. accounts receivable, and the general ledger. A full set of financial accounting reports is usually included within this suite of systems.
- **Sales and marketing systems** These systems store a vast amount of information on virtually all the key parameters that are used to measure the accommodation and hospitality business. Of particular importance is a customer data base that can profile individual guests and is a powerful source for pull marketing (see Chapter 5 – The Internet). Another important function is yield management. This enables a hotel to review the past performance of its rooms, e.g. occupancy levels, average length of stay), and set the optimum rates that will maximize the property's yield management programme.
- **In-room systems** Successful hotels are constantly striving to adapt their services to meet the needs of their customer base. These days, hotel guests, particularly towards the upper end of the market, are becoming increasingly technologically oriented. Business people need to access the Internet, principally for e-mail purposes, during their business trips. They sometimes find video-conferencing useful, especially when a company holds a business meeting in a hotel; and there are many other examples. While not all hotels will cater for sophisticated IT services, there is a pressing need for basic resources to be made available to business guests, such as Internet plug-in points, power sockets for portable PCs, in-room PCs, faxes and overhead projection facilities.

As you will no doubt gather, there are a wide diversity of support systems that need to be used by hotels. The problem is that there are very few software suppliers that can deliver an all embracing and fully integrated solution to a hotel's automation needs. While one software company may be particularly strong on core PMS systems, its food and beverage package may be weak; and so, hotels are forced to go to different software suppliers for different applications. Naturally, there are several software company's that claim an all round automation capability; but, nevertheless, hoteliers are faced with the issue of: 'Whether to choose a reasonable all-round system from a single supplier or choose several specialist application packages from a number of software suppliers?' This is not an issue that is easy to resolve; and it leads on to the second problem faced by hotel management wishing to automate – standardization.

I have discussed standardization before in the context of several areas of travel and tourism automation (see Chapter 1 and TTI). Sadly, in the area of hotel automation, there is very little compatibility between sub-systems supplied by different software companies. Therefore, unless a hotel chain puts all its eggs in one basket and opts for a single software package providing all-round functionality, then it faces a serious obstacle to future growth. Even if a single package is chosen, the situation can still mitigate against the hotel's original choice. Say the hotel branches out into an area of the business that is completely new. Its single system chosen by the hotel in its formative years may not provide the required functions for the new service. So, another software supplier's system needs to be obtained and the hotel is straight-away faced with the old problem of incompatibility: 'How can the new system feed data to the old system so that management can enjoy integrated accounting tools and overall management control of their entire business?'

The problem of non-standardization seems to be just as bad all around the world. There seems to be virtually no consistency between different systems. This problem has often inhibited mergers and acquisitions between hotel groups. After all, how can a hotel buy another if its entire inventory and room management systems are entirely different. OK, they can be changed and one hotel's systems can be migrated to the others. However, this is a costly game to play and there have been instances where the migration effort has had to be abandoned at great cost. Only in the USA does there appear to be light at the end of the tunnel. The Hospitality Industry Technology Integration Standards (HITIS) project has been initiated by the American Hotel and Motel Association. This group has been charged with evaluating the possibility of establishing standard interfaces between various types of hotel systems, e.g. between PMSs and POS devices, between PMSs and central reservations systems, between PMSs and food and beverage systems). The only drawback is that there is no representation on this body by either Europe or any of the other major trading blocks around the world. However, the project represents a serious attempt at addressing the standards issue, as evidenced by its 23-strong committee including three members from Microsoft. Its mission statement is:

> 'To direct a non-proprietary, consensus based process to develop voluntary standards for the integration of evolving computerised system and sub-system transactions in the hospitality industry. The process will seek to synthesise and disseminate previous and current efforts to resolve such issues and allow hospitality operators and vendors alike to save on costly retrofitting solutions and enable faster technology adoption and evolution within the various segments of the hospitality industry.' More information can be found at **http://www.hitis.org**.

This has been a quick overview of the kinds of systems that hotels used to manage their operations and control their inventory. I won't be discussing distribution systems in any more detail here because this topic is covered by several subsequent chapters, i.e. GDSs, videotex and the Internet. However, there are a few other miscellaneous aspects to hotel automation that you need to know about before we embark on the alternative distribution channels. I have discussed each one below:

- **Room rates** There are many different types of room rates that hotels offer to various categories of guests. Business travellers often pay peak rates because their visits are booked at short notice, during peak times of the week and they require a higher standard of accommodation. However, partially offsetting this is the willingness of hotel chains to grant special rates to certain companies that deliver a high volume of bed-nights to their hotels. By contrast, holiday-makers book well in advance, stay at off-peak times, e.g. weekends, and do not always require such a high standard of room. Leisure travellers are often able to enjoy special bargain breaks and deals that involve complimentary or reduced price meals. Each type of guest is therefore allocated a different type of rate by the hotel, even if they stay in the same room. So, in order to understand hotel systems, it is worth spending a little time introducing some basic terminology in relation to room rates. It seems that each industry has its own jargon and buzz words and the hotel sector is no different in this regard. These may be summarised as follows:

- *Rack rate* This is the full rate as published by the hotel. It is the rate for a room that does not include any discount at all. In other words it is the rate that you or I would probably be quoted by the hotel if we were to walk in off the street and ask for a room.
- *Corporate rate* This is a special rate that is strictly only available to business or special users of the hotel. It is a rate that a hotel may give under its own discretion in exceptional circumstances.
- *Negotiated or preferred rate* This is a rate that is negotiated by a travel agent or a company directly with a specific hotel. It is usually dependent upon a minimum amount of business volume and is available only via the party that negotiates the rate. A travel agent with a large business house account can often negotiate a special rate on behalf of his/her corporate customer.
- *Promotional or weekend rate* These rates are only available via a package that the hotel arranges and provides for its guests. Packages often include a meal plan and some other activity organized by the hotel. Promotional packages are usually only available at weekends and are aimed at filling rooms unused by business guests that are the mainstay of a hotel's trade during the working week.
- *Net/net rate* This is the lowest possible rate and as such is one for which the hotel does not pay a commission. Some hotels will, however, supply certain special customers with rooms on this basis. Despite the fact that these bookings represent loss making transactions, they are nevertheless supported in order to provide an all round service. Many reservation systems do not support a net/net rate because there is no way for the hotel to recover the cost of making the booking.

- **Assured bookings** In the past it was sometimes the case that hotel reservations were subject to the dreaded 'lost booking' syndrome. This occurred when a travel agent made a reservation for a customer in a point-of-sale system that appeared to have worked perfectly. The trouble used to be that the travel agent's message to the hotel was never successfully delivered. Consequently, when the customer turned up, there was no reservation and everyone involved in the booking blamed one other. Once a problem like this is experienced, the word soon spreads that hotel systems are unreliable; and it takes a long time to re-build lost confidence. Since then, distribution systems have improved dramatically and hotel switches have virtually eliminated this problem.
- **Travel agents' commissions** As far as hotel commission payments are concerned, travel agents used to regard themselves as lucky if one in ten bookings resulted in a commission cheque being received from the hotel. From the hotels' perspective, they were faced with dealing with hundreds or perhaps thousands of very small commission cheques that were mailed to hundreds of travel agents all around the world. Travel agents had to deal with individual cheques worth only a small amount each and often written in a foreign currency. All in all, neither the travel agents nor the hotels were very impressed with the old hotel booking and administration process.

  However, a lot has been done to solve these problems over the past few years. The hotels have realized that in order to obtain a greater proportion of their bookings from travel agents they need to make the process as simple and as accurate as possible; and there is substantial potential to be gained by hotels from travel agents. At present only about 28 per cent of hotel bookings are generated by travel agents. The remaining 72 per cent are booked directly by consumers or companies. One of the facilitators that will enable the travel agency distribution network to be a prime source of hotel business growth is the widespread use of GDS technology. This has tended to not only cure the problems I outlined above but has made it less costly and therefore more profitable to handle hotel reservations, provided they are done using computer terminals and not over the telephone. A telephone call takes a lot of selling time and can cost a lot of money.

The key issue for a hotel is yield management. This is a term used to cover the process of applying the

most effective rate to a room in order to maximize overall revenue for the hotel. This is a balance between: (a) charging the highest possible room rate, but running the risk of fewer bookings; or (b) filling all hotel rooms, but at a lower rate. Obtaining the optimum balance is an exercise in pure economic theory. Too high a room rate and you will not attract sufficient numbers of guests to make a profit. Too low a rate and you will not receive sufficient income to cover your operational costs. Reservation systems have helped hoteliers with this problem. Systems have enabled hotels to shift the focus of their rates away from fixed room types each with an associated rate, and instead to move towards having individual rates for each room.

Take, for example, a hotel with 20 rooms, of which five are superior suites, ten are twin bedded rooms and five are single rooms. The classical approach taken by the hotel to market these rooms was to assign a rate to each of its three room types for each season of the year. Although this works OK in practice, it can be inflexible, particularly in times of either high occupancy levels or lulls when many rooms are empty. What many hotels are now doing is to designate all their rooms individually, each with its own rate that varies from time to time. In our example the hotel would describe each of its 20 rooms individually and assign a price to each one. Each room is described in terms of, for example, a room with two beds having a view of the sea from the top floor with a South facing balcony. The room would be assigned its own particular room rate that would vary not just by season but interactively depending upon the hotel's occupancy levels at any point in time. This approach is more flexible and allows the hotel to achieve a far higher degree of control over its rates depending upon current and forecast occupancy levels. So, if eight of its old style twin bedded rooms were taken, the remaining two could be priced slightly higher. Pure market economics.

Now this would have been rather difficult to achieve before the advent of computerized reservation systems. But with an on-line system that can be updated rapidly using computer terminals, an individual room can easily be assigned a rate that varies on, for example, a daily basis. Another supporting factor has been *seamless connectivity*. With *seamless connectivity*, end users accessing the hotel's reservation system via a GDS can see their displays exactly as they are formatted by the hotel's own system. In the past, GDSs have edited hotel displays because they could not show them in the same format as the screens that the GDSs use for airline availability. Most GDSs and other booking channels, such as the Internet, now support *seamless connectivity* to hotel systems. Hotels that have adopted flexible pricing for individual rooms have enjoyed a higher yield, which should mean increased profit. It does, however, place increased demands on hotel general managers to possess marketing and entrepreneurial skills in preference to classical abilities focused on running an efficient hotel operation.

This has been a brief look at how hotels use IT to automate their in-house operations. As I have mentioned before, it is important to understand these systems because many of them provide a platform for alternative distribution channels which are the subject of subsequent chapters. Finally, let's take a closer look at a particularly good example of a hotel chain that uses technology very effectively – Marriott Hotels.

MARRIOTT

Marriott International is a hospitality management company. Lodging products and services include International hotel brands such as Ritz Carlton, Marriott Hotels and Resorts, JW Marriott luxury hotels, Courtyard by Marriott, Fairfield Inn & Fairfield Suites by Marriott, Residence Inn and Townplace Suites by Marriott, Executive Residences by Marriott, Marriott's Vacation Club International, Renaissance International, New World, Ramada International and Marriott Conference Centres. One of the key success factors in Marriott's growth over the past few years has been their central hotel reservations system called MARSHA (Marriott's Automated Reservation System for Hotel Availability). MARSHA was developed in the 1970s and used airline reservations systems technology as its platform. The software which supports this platform is IBM's TPF (Transaction Processing Facility). TPF is a sophisticated piece of software designed to run (not surprisingly),

on IBM main-frames. Its key strength is its processing efficiency which enables extremely fast response times to be delivered to large populations of reservation operators using main-frame linked terminals. One of the ways it accomplishes this is by the use of clever coding systems which reduce the size of a reservations message and its response to just a few characters. However, as we shall see later, this technology, although still very fast and efficient, does not lend itself quite so well to graphical based GUI systems and messages which comprise large amounts of data.

MARSHA is used by Marriott as the group's central reservations facility. As such it is connected to all of the world's major GDSs (Global Distribution Systems) which also operate on a TPF platform, and from these systems to PC terminals used by travel agents at the point-of-sale. They also connect to some lesser volume producing GDS's and the Internet via the Thisco switch (see Chapter 5: Distribution Systems) MARSHA is also accessed by Marriott's central telephone reservations operation which is housed in a purpose built centre in Omaha Nebraska in the US. This centre, chosen for its central geographic location within the US, houses around 1,600 telephone reservations operators who work shifts to provide round the clock service worldwide. Each operator uses a telephone headset to receive incoming telephone calls and is able to provide customers with live information on all of the chain's properties around the world using their MARSHA computer terminal.

MARSHA has been an excellent platform to support the growth and development of Marriott's hotel brands and its associated businesses. One of the basic reasons why Marriott have been so successful in exploiting technology to support their business is a clear information systems strategy. The keywords here were and still are, uniformity and standardisation. Marriott always made it a rule that any property or franchise which joined the Marriott chain must have a PMS (Property Management System), which is compatible with MARSHA and which can support a two way automated link between the two systems (i.e. between the property's PMS and Marriott's MARSHA). This is a fundamental axiom which guarantees last room availability to Marriott's customers. This is so important that it is worth explaining it in a little more detail. When a Marriott telephone reservationist uses MARSHA to inquire on the status of a room in a specific property, they may for example see that only one room is left for sale on a given date. If they are going to be sure that they can sell this room, they must be able to rely 100% on the accuracy of the MARSHA data base. This is possible only because the central MARSHA reservations system is in a continual two-way dialogue with the PMS used by the property concerned. So, if the PMS has one room available then Marriott's automated reservation system for hotel availability (MARSHA) will show that room as available for sale. Once the reservationist sells that room for the date specified, it is not only recorded as such in MARSHA but is also immediately communicated to the hotel property's PMS. The two systems are therefore always in synchronization, thus guaranteeing the quality of the information available to central reservations. Today, over 98 per cent of Marriott's properties use an on-line two-way link between MARSHA and their PMSs.

The benefits of Marriott's reservations systems standardization strategy have also paid off in the area of GDS interconnection. In the early days of the 1980s when GDSs were known as CRSs and they focused almost entirely on airline reservations, the inclusion of hotel and car services was a revolution. So, when Marriott established a direct connection to the System One CRS in 1987 it was breaking new ground. This was followed in 1989 with a fully automated link to Sabre in 1989. Marriott connected MARSHA to the Apollo, PARS and Abacus systems progressively over the ensuing two years. This GDS–CRS interconnection was no trivial matter for either parties. There were significant developments that the host CRS–GDS systems had to fund and there were similar modifications also required to MARSHA. After all, when you think about the basic products, i.e. airline seats and hotel rooms, they are fundamentally different in many ways. Airlines have fields such as departure–destination city pairs, and a number of seat classes: hotels have a range of room grades and special accommodation packages. It is because the two products are so different that these modifications had to be made to the systems involved. Eventually, Marriott, like many other hotel chains,

decided to establish a single connection to a hotel industry switch called Thisco. Thisco could then take on the onerous job of interconnecting to the GDSs on behalf of their hotel members (see Chapter 4 for a full description of Thisco). Today, electronic reservations generated by all hotels via the GDS channel have grown from 25 million in 1995 to over 33 million in 1996.

Clearly then, Marriott recognizes the importance of its reservations system in supporting profitable, high quality, customer service led growth. The company continually strives to enhance and develop MARSHA further to provide its customers and users with a higher level of service. Over the past few years, the population of MARSHA's GDS travel agency users has grown significantly, especially in the USA where 80 per cent of all agency hotel reservations are now made via GDSs. The problem has been that this percentage is far lower outside the USA. In Europe, for example, during the early part of 1995, travel agents made only 2 per cent of their hotel bookings via GDSs. Although this has grown steadily to over 50 per cent by 1997, a continual programme of enhancements is needed to drive this growth further in the international arena.

One such enhancement goes under a number of terms, such as Galileo 'inside availability' and Sabre 'direct connect availability' (again, see Chapter 4 for more information on these GDS terms). However, they all refer to the 'seamless' functionality that allows a GDS user, i.e. a travel agent, to use their terminals just as though they were connected directly to MARSHA. There is no translation undertaken by the GDS and the travel agents see the displays just as MARSHA formats them. To support this, MARSHA was upgraded to MARSHA III in 1995. The new system now supports full room descriptions, rate details and many other important fields just as they would appear on a native MARSHA screen. This is particularly important when a user is discussing a customer's requirements and trying to decide on a room type. Does the code for superior twin-deluxe room in one system mean the same thing in another, for example. With the new comprehensive MARSHA descriptions, the review and decision process can be made in the comfort that it is based on higher quality information.

Despite the success of Marriott's automation programme, today's consumers expect the systems they use to support full multi-media technologies and GUIs. Although travel agents may be happy to continue using text based GDS systems for some years yet, even they may eventually come to expect a next generation reservation system. This is one of the reasons why Marriott has expanded MARSHA to provide a full information, reservation and payment facility using the Internet. This whole area is explained in more detail in Chapter 5 – The Internet.

Tour operators

Tour operators are in the business of combining travel products from several suppliers into unique holiday packages that are marketed to consumers. So, they are: (a) very much in the leisure business, and (b) highly dependent upon successful inventory control for their profitability. As with airlines, most of their sales originate via travel agents (although some direct sell tour operators are beginning to emerge). It is therefore vital that a tour operator's performance objectives include such factors as: the availability of systems that enable internal operations to run effectively, networks that enable their products to be booked easily by travel agents, and reporting systems that enable information on sales to be tracked on a current basis. IT is a key success factor in helping tour operators achieve these performance objectives.

Tour operators aim to save their customers the hassle of booking their own flights to their destinations, searching for the best and most affordable hotels and coping with all the ancillary chores that go hand in hand with foreign travel. Chores such as baggage handling, transportation between the airport and the hotel, tips, sightseeing tours and, last but not least, the language. The tour operators do this at the lowest possible cost by buying in bulk, packaging all the required services into an all inclusive holiday and selling this package to customers via travel agents.

The process starts a long way in advance of the date that the holiday will actually take place and it commences with the holiday design phase. The tour operator's marketing staff decide upon

the type of holiday that they think: (a) will fit the operator's image and reputation, (b) will sell sufficiently well enough to make a decent profit, and (c) will appeal to the type of customer that the operator is targeting. Having decided upon the holiday design and specification, the operator will despatch its buyers to the destination resorts to negotiate the number of rooms needed to satisfy the expected demand for the holidays being sold. In most cases the hotel space is arranged one to one-and-a-half years before the season. Aircraft seats are also obtained a fair time in advance and these are obtained in blocks. Then there is the uniformed representatives to arrange and all the other ancillary services to purchase. While all this is going on, the brochure is being printed. To control this process the operator creates a large inventory of travel products that have been contracted with the various suppliers, e.g. charter airlines, hotels, local transportation companies, etc. This inventory is stored on a computer data base.

In these early stages of a packaged holiday's life, the data base provides the operator with a control mechanism to ensure that the required services are in fact contracted and that the rates and conditions are stored for pricing purposes. The operations staff work in conjunction with the marketing staff to link the services contracted with the tour package to be marketed. This is how the tour cost is calculated and the selling price determined, which in turn allows the inventory to be created. It is this tour inventory that is referenced each time a customer enquires about a booking. Now, let's look at an actual example of a tour company and how it uses IT to control its business operations.

COSMOS

Cosmos makes very effective use of IT to support the distribution of its package tour, coach tour and seat only businesses. But before we plunge into a review of this company's deployment of IT, it is worthwhile considering how Cosmos came into existence and understand a little more of the background that led to it becoming a leading supplier of package holidays. Cosmos is owned by the Globus Group. Globus itself is a private company, which was formed in 1928, and is run from its headquarters in Lugano, Switzerland. Globus focused initially on selling coach tours within Europe. Then in the early 1960s, Globus decided to enter the packaged tour business from the UK and created Cosmos. Soon after this, Cosmos formed Monarch, its own charter airline, to support its new package holiday business. Globus then moved into the USA market with the acquisition of Gateway Tours, which provided both air travel services into the USA linked with coach tours of the country and a growing market for the supply of coach tours of Europe including the British Isles. Globus and its TOURAMA coach programme, is now the largest coach tour operator in the world. It has general sales agents (GSAs) and associates in most of the major destination countries of the world. More recently, Globus acquired Avro, which is a leading seat-only air travel supplier, and in 1995 followed the general industry trend towards vertical integration with the acquisition of a leisure travel agency chain called Apollo Travel. Apollo has five retail outlets and a large telephone sales operation.

It is interesting to consider the way in which Cosmos has deployed its IT resources during the time of its fairly rapid growth. The two main drivers of Cosmos' automation programme have been: (a) communications networks that link tour operations' headquarters with destination service offices overseas, and (b) distribution systems that provide direct access to travel agents for sales support. Let's take a more detailed look at both these areas:

- **International communications** Cosmos has adopted a distributed approach to systems development but with a firm control on technology standards. This has dual benefits: (i) it allows destination areas to have the flexibility to develop the systems they need for their own local operations and (ii) it ensures that the overall business retains a high degree of compatibility across all its different systems. Cosmos uses Microsoft products for local applications development and office automation. This started with the simple need to transmit a rooming list from Cosmos' headquarters in the UK to a destination office in a resort area. This commonly used function has been

gradually enhanced over the years using standard Microsoft Access products. It is currently an application that is initiated by the destination office by dialling into the company's computer system and downloading a rooming list file for local printing. The format of the transfer is EDI and this enables the local destination office to import the file into its local data base.

Globus and its Cosmos subsidiary have a growing need for international telecommunications services. The rooming list example I gave above is just one of the many applications that need to be distributed around the world. There are many others. Cosmos needs a telecommunications network that is: (a) available as and when needed, i.e. not necessarily permanently on-line; (b) capable of providing the high transmission speeds that its business applications require; and (c) is cost effective. As business volumes grow at Cosmos, this requirement for a global telecommunications service will increase in importance to the company.

- **Distribution system** Cosmos launched its viewdata booking system in 1988 when it had become clear that videotex was a technology that the majority of travel agents had committed to. The Cosmos main-frame, an ICL VME computer, was enhanced with multiple front-end communications processors. These each have a direct connection into the two leading networks that distribute videotex access services to travel agents throughout the UK (see Chapter 6 for more details on these communications network companies). The configuration used by Cosmos offers a high degree of reliability and integrity due to two main factors: (i) the host main-frame is insulated from the communications processing functions that pose a higher level of interference risk, and (ii) the multiple front-end configuration allows for either a single computer or communications link to fail without necessarily shutting down Cosmos' entire distribution system (see Chapter 6 for more information on Cosmos' videotex distribution system).

Cosmos decided some years ago that because its core business was tour operations, it would outsource its ICL main-frame and front-end computer operations. The overheads in terms of staff levels and skills required to run such an operation are considerable and Cosmos decided that it would be best to let a professional computer service company provide these services. These computers were therefore outsourced to the SEMA Group, which houses the computers and provides a full physical operational environment for them: although the Cosmos ICL main-frame and front-end computers are actually located and run off-site, they are nevertheless controlled and operated remotely by Cosmos' own operations staff. This enables Cosmos to concentrate on its local in-house office technology and overseas destination service support systems. So, the various departments, such as accounting, reservations, administration, contracting and aviation control, all run their own PC networks that are either based on Novell or Microsoft Windows NT network operating systems.

However, outsourcing your computer operations does not remove the responsibility for applications development and maintenance. Cosmos has decided that for sound strategic reasons, it will migrate its main-frame operating system environment and the associated applications to an open systems architecture. This means converting its current main-frame environment to a UNIX-based operating system. This allows for more 'openness' – in other words, a wider choice of hardware platforms and applications support software, e.g. data base management systems. Having reviewed its options for information management, Cosmos has opted for a standard flat file approach for core operational systems rather than using newer technology such as relational data base management systems. The reason for this is that speed and end-user response time are the critical factors that determine Cosmos' required service levels. While relational data base management systems are excellent for data manipulation, e.g. management information and enquiry systems, their inherent flexibility gives rise to a processing overhead. Flat files are better for straightforward fast processing of repetitive transactions in a real-time on-line environment.

The Cosmos tour reservation system, like many others, uses a technology called 'inside access' to review, obtain and confirm scheduled airline seats.

This is an interesting function and one that is worth examining in a little more detail because it will no doubt be used increasingly by tour operator systems in the future. When a Cosmos reservations operator receives a call from a travel agent wishing to book a package tour for a customer, the operator needs to provide instant confirmation of the booking. If the package tour happens to use a scheduled flight then, historically, the only way of providing an instant confirmation was to put the travel agent caller on-hold while a separate GDS terminal was used to check availability and make a booking. This is because airlines are reluctant to allow tour operators to hold allocations of their scheduled flight seats in the hope that they will all be sold. If the tour operator does not manage to sell their allocation, the airline is left with the job of selling these seats, usually at the last moment. This often involves selling the seats at a discount and consequently loses the airline valuable flown revenue. Instead, airlines prefer tour operators to use their GDSs to access their seat inventories and book those actually needed by their customers.

With 'inside access', this is done automatically by the tour operator's system. The reservations operator first uses his/her in-house tour system's reservations function to select the desired package holiday from the inventory. This presents the operator with one or more screens of information about the holiday. Then, when the travel agent enquires as to the availability of the holiday, the operator selects an availability-check function. In the background, the system links directly to the tour operator's chosen GDS, sends an availability request transaction, receives the response and displays this to the reservations operator. This exchange is accomplished entirely automatically using a set of machine-to-machine EDI messages without the operator being aware of the dialogue with the GDS. A booking is made in a similar way; the inventory is decremented and a booking message sent to the GDS to reserve the scheduled airline seat. Inside access is now also an integral part of the viewdata booking system and is an important new technology that has helped Cosmos improve service levels and increase the productivity of its reservations operations while also maximizing airline seat revenues.

Like most other tour operators, Cosmos is facing several important business issues, many of which relate to distribution technologies. Because these are closely linked to viewdata and the new Internet-related technologies, I have discussed them in more detail in Chapters 5 and 6. However, I hope this short analysis of Cosmos has given you an insight into the technologies used by tour operators that often also represent their platform for product sales distribution.

Rail companies

By its very nature, rail travel is run on different lines in different countries (you can't argue with that, can you?). This national culture of the railways is reflected in the systems and technology that are used to support the sale of rail tickets. Systems differ widely across different countries and there is no clear or consistent pattern to these systems. So, I shall pick the UK as an example of a country that has a thriving national rail network and that uses IT to sell its product.

Rail travel in the UK

Rail travel in the UK has undergone a radical shift in its core infrastructure during the 1990s as a result of the privatization programme initiated by the British Government. The old monolithic British Rail network has been broken up into two main components: (i) Railtrack – which operates the railway lines, switching points, bridges and stations; and (ii) the train operating companies – each of which operates the trains in various regions of the country for a contracted period of time. In addition to this there are several support organizations that deliver specialized services to the businesses. All of these individual entities are monitored by the rail regulator, an independent authority that is appointed by the Government to ensure fair play, appropriate pricing and the delivery of a consistent service to the public.

Rail tickets are sold to travellers by the train operating companies. Each of these train operating companies are required by the regulator to be a member of the Association of Train Operating

Companies (ATOC). This is strictly an association and is not a trading company, although it does appoint companies to perform certain support functions as part of a commercial arrangement. One of the main functions of ATOC is devolved to a group designated the Rail Settlement Plan (RSP). This group is principally responsible for ensuring that the revenue derived from the sale of rail tickets by whatever means, is fairly and equitably shared among the train operating companies. So, for example, a ticket from Brighton to Edinburgh will be purchased as a single ticket at a pre-set price. However, this ticket revenue must be apportioned between Connex South Central, the London Underground and Great North Eastern Railways. The ability to do this is provided by a complex set of inter-related systems that have been developed over many years by different parts of what used to be British Rail. Responsibility for the operation and development of these systems has been contracted-out by RSP to the SEMA Group, a large European facilities management company.

SEMA is therefore responsible for what used to be known as the British Rail Business Systems (BRBS). The portfolio of systems that are supported by this new group are many and varied. They include: (i) the large and powerful central main-frame computers located in Nottingham and Crewe; (ii) the point-of-sale systems used to distribute ticket sales to travellers; (iii) the information systems that support the retail sales activities, such as the telesales centres; and (iv) the revenue accounting systems that feed the train operating company's general ledgers. Let's take each of these types of systems in turn.

Central main-frames

There are two main-frame computers located in Nottingham and Crewe, each of which is capable of processing the other's work. This provides a fail-safe computing environment that safeguards the network against failure of a single facility. These computers hold the rail inventory that comprises timetables, reservations and fares:

- **Timetable** The operating dates and times of every train run by each train operating company is stored in a large data base called the computer aided timetable enquiry (CATE). This data base is updated daily by an interface from Railtrack's train planning systems. The CATE data base is the core of many other systems, some of which I will be explaining in more detail in a moment.
- **Reservations** This application, known as the central reservation system (CRS), supports train seat reservations and APEX yield management. It contains a great deal of information on stations, routes, restrictions and holds all retailing rules.

  Depending upon the response to a timetable enquiry, as described above, a reservation may be requested. This is made on a special purpose screen that asks for position (window or aisle), direction (facing or non-facing), dining seat, smoking/non-smoking or sleeper compartment. Only those facilities available on the train service requested are shown. Where a reservation is made for a customer, the rail main-frame computer in Nottingham creates a PNR, so that the reservation may be recalled at any future point in time for customer service purposes.
- **Fares** The fares data base is called the central prices file (CPF) and is enormous. It holds over 54 million individual fares. The reason it is so large is due to the commercially oriented pricing strategy established by British Rail many years ago. In essence, this strategy considers every single possible combination of origin station, destination station, route and class in the entire network as a possible individual fare. The rail main-frame computer system that runs CPF provides access to the fares data base and makes selecting the best fare deal for a customer very straightforward. Besides showing fare options, CPF can also show fares by ticket type. Most of the information that is needed to produce a ticket, including the fare, for example, would already have been entered as part of the reservations process described above. However, additional information may be added prior to ticket printing. This could include, for example, the form of payment. This may specify the usual means or a combination of payment methods.

  The fully automated customer enquiry terminal system (FACETS) enables an itinerary

to be planned for a customer by entering the from and to cities (in fact either the full names of the cities or the three-letter codes for cities/towns may be entered), the time of travel and the type of fare requested. The system responds with a screen showing the suggested itinerary as specified. For each leg of the itinerary, i.e. the from/to stations involved in each train journey, the system shows the station name, the departure time, arrival time, the accommodation available on that train, whether it may be reserved and, finally, whether there is any available space to be reserved.

The central main-frame system represent the core around which both current and future UK rail automation systems are based. This core comprises a number of systems that are highly inter-related and some of which are being released in stages over the next few years. These systems, originally known collectively as the joint distribution system (JDS), also support the point-of-sale rail functions that I will describe in more detail in a moment. The JDS product was first demonstrated at the 1992 World Travel Market in London.

The JDS was so called because the intention was to support jointly the reservations and operations of both the UK's train operating companies and European Passenger Services Ltd. The latter, which became Eurostar .UK Limited (EUK), operates the new channel tunnel based rail service to the continent. These services that are branded 'Eurostar', operate principally between London and either Paris or Brussels, and started operations in 1994 when the tunnel opened. Cross-channel car and passenger services are provided by a separate train operating company called Le Shuttle. The original concept was that a single PC system would have access to both the UK rail main-frame computer in Nottingham and the EUK computer in Lille. As it has subsequently turned out, there are two systems in current use: (i) the Tribute system, which is aimed mainly at in-house rail servicing points; and (ii) the TSG system, which is the strategic travel agency point-of-sale system. Both systems derive most, if not all, of their data from the main-frame systems in Nottingham and Lille. I have explained each one in more detail in the following sections.

Having said this, two factors need to be recognized: (a) the central main-frame in Nottingham will continue to be the platform for all automated UK domestic rail services, and (b) the local train operating companies in the UK are perfectly free to develop their own systems, e.g. for marketing to travel agents and for internal use in local rail stations and booking offices. The latter point may become more relevant as time goes by: so, for the moment, I've chosen to concentrate solely on ATOC's main-frame systems in Nottingham and Crewe because they have the most significant potential for domestic rail travel in the UK.

Point-of-sale systems

Over the past two or three years, ATOC has been focusing on developing the next generation of technology to support sales from its own ticket offices as well as travel agents. In particular, it has recognized the trend among travel agents towards the more widespread use of GDS PCs and the necessity to produce automation products that are inexpensive and easy to use. This has to a large extent been driven by the need to support new products, such as the continental channel tunnel services, and the desire to direct more ticket sales via travel agents, especially for business travel. The expectation is that travel agents will be selling a higher volume of more profitable rail products in the future and that this will be accomplished to a large extent by using sophisticated point-of-sale technology. Looking longer term, there is the potential for increased overseas sales of rail products and services via GDS networks that extend to other countries.

Rail tickets may be issued to the travelling public from a variety of different machines. Each machine has been designed to serve a specific purpose, whether it be for train operator staff in ticket offices, by travel agents or via self-service consumer activated machines. Here is a description of the main types of point-of-sale systems used within each part of the rail distribution network:

- **Stations** Ticket offices in stations use an all purpose ticket issuing system (APTIS) to issue tickets and record sales transactions. APTIS has been used successfully by British Rail ticket offices since 1986. The machine is a purpose

built piece of hardware and can only be used for issuing rail tickets. It also requires two separate power sockets and an on-line communications capability. The communications facilities needed are a British Telecom Rapide socket and an approved modem, which are required so that tariff data can be downloaded from the British Rail main-frame and ticket sales can be uploaded overnight. One of the few problems nowadays with APTIS is that few rail stations have devices that are capable of processing the bubble memories used in the original machines (bubble memory is a rather outdated storage technology).

Although it is possible for APTIS to be used by travel agents, they need to generate a high volume of rail business to justify it economically. This is because the machine must be leased on an annual basis and is quite costly (about £4,000 in the first year alone). A general guideline is that an agency needs to have British Rail ticket sales of at least £0.5 million per year in order to justify an APTIS machine. It is for this reason that only the largest of the multiple travel agency branches use APTIS machines. Often such branches house a central rail ticket issuing operation that services several regional branches (or even all UK branches). In total, there are currently 2,500 APTIS machines installed in the UK.

In the future, SEMA will be enhancing the software that runs on the APTIS hardware. The hardware is extremely robust, reliable and has a keyboard designed exclusively for rail ticket sales. This hardware can therefore be used as a firm base to develop on-line links to the main-frame timetable and fares data bases and also to card authorization systems.

- **Trains** Ticket inspectors on trains use the Super portable ticket issuing system (SPORTIS) to issue tickets and record sales transactions. SPORTIS is a portable ticket issuing machine used by roving ticket inspectors on trains, at departure gates and smaller stations. It is less sophisticated than APTIS and stores fewer fares and ticket details. Data are exchanged with SPORTIS by removing the memory and inserting the removed cartridge into a special device. This device reads the stored data on the tickets issued and writes updated tariff data into the memory. The memory is then re-inserted into the SPORTIS machine. There are 3,000 SPORTIS machines currently in use throughout the UK at present.

  The software that supports SPORTIS will be used as a base on which to enhance the system further in the future. A new hardware platform is to be developed with a capability to produce magnetically encoded card-sized tickets for use on the underground. The challenge for this development is to find batteries that are powerful enough to drive the encoding technology, which is rather power hungry.
- **Telesales centres** Telesales centres and other retail servicing points use the Tribute system to provide information support for incoming telephone calls from customers. Tribute is a software product that runs on a PC. The PC uses telecommunications technologies to communicate with the main-frame computers for fares, timetable and reservations support. The main user is the National Rail Enquiry Service (NRES), which was set up at the direction of the UK's rail regulator. This is a telephone service centre that receives calls from customers and is accessible via an (0345) local call number from anywhere in the UK. In total, there are 700 Tribute systems installed in the UK. The major features of Tribute are:
  - *Full function rail system* Tribute is used for a wide variety of functions related to the sale of rail tickets. Although the focus of the system is on the InterCity and Eurostar services, all UK train services are supported. The principal functions are ticketing, quick issuing and balances.
  - *Ticketing* When all information has been entered the user may request an ATB ticket to be printed with an encoded magnetic strip on the back. Cancellation of tickets can then easily be processed because the ticket to be cancelled is simply inserted into the ATB printer, which reads the ticket details encoded on it and automatically displays a cancellation screen for further processing. Credit card charge forms may also be printed automatically.

- *Quick issue* Each Tribute PC workstation has the capability to store up to 50 frequently used itineraries. Once stored, these template itineraries may be called up and used to shortcut the entire journey planning, reservations and ticketing process. Because each operator may have his/her own set of quick issue itineraries, the total scope for tailored processing is considerable.
- *Balance function* The user may request a status of the sales made to date and the amounts of moneys taken, at any time. This supports the control of telesales cash and sales processing functions.

- **Self-service** Self-service machines branded QUICKFARE are located on the concourse of 1,000 stations around the country. These machines issue tickets in exchange for cash, i.e. notes and coins. At present these machines do not accept plastic cards. The QUICKFARE machines are supplied from a Swiss company called Ascom Autelca and are extremely robust and reliable. In addition to QUICKFARE, some train operating companies have decided to use ATM style ticket issuing machines, which are marketed by a separate company called SHERE. There are now over 20 SHERE self-service ticketing machines installed in several stations. These machines issue ATB format rail tickets and accept plastic card payments from customers.

  SEMA are working with Ascom Autelca to evaluate further enhancements to the QUICKFARE machines in the medium term. One option is to extend the current payment method from cash to include plastic cards. This will in turn require an on-line link to the major card authorization systems from each QUICKFARE machine. Although the QUICKFARE machines are high quality, robust and reliable, the fact that they must handle cash makes them an expensive proposition for widespread roll-out to more stations.

  So, a more cost effective solution is being sought by SEMA. It is currently considering the development of its own self-service ticketing machine that would only support plastic card payments. This new machine would work in conjunction with the telesales centres. Customers could telephone a telesales centre to discuss options and book their journeys. They would make arrangements with the operator to collect their tickets upon departure at the stations nearest to them using one of the new self-service machines. The insertion of the customer's card would enable the ticket details to be retrieved from the main-frame computer, printed locally and dispensed from the machine. This would of course require on-line telecommunications from the self-service machine to the Nottingham main-frame computer and the major card authorization systems.

- **Travel agents** Travel agents use a number of systems to obtain information on rail travel and issue tickets to their customers. Although some very large agencies use APTIS, as described above, for most travel agents the two most commonly used systems are: (i) the reservations functions available via the GDSs, and (ii) the agent ticketing system (ATS). I'll describe each in more detail:
  - *TSG* ATOC has designated TSG as the travel agency system of the future for rail sales and servicing. Incidentally, the term 'TSG' is to be renamed soon and explaining its initials would only serve to confuse so, let's stick to TSG for the purposes of this explanation. Over 400 travel agents currently use TSG and the medium term target is to grow this to 2,000 or more. With TSG, travel agents are able to use their GDS PC terminals to link into the rail main-frame computer in Nottingham. This link is effected by means of a switching technology that is slightly different for each GDS (see Chapter 4 for a description of how each GDS implements non-air supplier access). So, TSG is a set of enabling technologies that distributes Nottingham's central main-frame functions, such as reservations, ticketing and servicing, to travel agents using their existing point-of-sale GDS PC terminals. In concept, this is similar to the way in which airlines distribute their sales functions via the GDSs. As such, it is *not* therefore a piece of software that runs in the agent's PC. TSG was originally developed by Eurostar to enable travel agents to gain access to their new channel tunnel train services via Galileo.

Using TSG, seats can be reserved on certain UK domestic rail journeys in both first class and standard coaches of all InterCity trains using GDS terminals installed in travel agencies. Reservations can also be made on most inter-urban rail services. First class single and standard twin berth sleeper compartments are reservable on all InterCity sleeper trains. The travel agent can choose certain reservations preferences for their customers such as, window or aisle seat, facing or back to the direction of travel, dining seat or non-dining, smoking or non-smoking seats.

Travel agents can use their existing GDS terminals to access the rail main-frame system using the 'BRL' entry. Agents without a GDS can use viewdata terminals using the Imminus or AT&T travel networks, again using 'BRL' as the access code (see Chapter 4). Agencies with the latest Galileo Focal Point UK terminals have the additional benefit of access to FACETS. This system runs on the rail main-frame computer and supports an integrated fares, timetable, availability and reservations facility that compares favourably in terms of functionality with most airline systems. At a certain point in time, a few hours before departure, the system prints reservations dockets for the departing train that a train operating company employee places in the appropriate headrest of each seat.

TSG can generate a rail machine interface record (MIR) for back-office accounting purposes. This main-frame created data record is therefore used to generate accounting transactions and is stored for future management information purposes (see Chapter 7 for more details on back-office or agency management systems). It remains the responsibility of the travel agent to ensure that their back-office system is capable of successfully processing the rail MIR.

ATB based ticketing is an important feature of TSG. This is supported by means of an ATB2 style ticket printer that is directly connected to the GDS PC. Incidentally, the ATB2 style ticket is the one with the magnetic strip on the reverse side (a plain old ATB ticket has no such magnetic strip). Only the ATB2 has the magnetic strip that can be read by devices at the ticket gate or *en route*. For continental travel, this will help speed the passenger through check-in formalities at the new Eurostar terminals instead of the old style travel document that will have to be exchanged for an ATB ticket before he/she can start his/her journeys. Shorter check-in times are of course especially essential to business customers who travel at peak times and usually pay full fares.

You may recall our earlier discussion of ATB type tickets and their associated printers in the section on airline reservation systems or GDSs. Well, the rail ATB (Fig. 3.7) complies with the IATA 722 encoding standards. This means that the data that are encoded on the magnetic strip on the reverse of the ATB, conform to a standard that has been set by IATA and used by all the airlines. The ATB printer is, however, different from most conventional printers in one important respect. In addition to printing an ATB and encoding it simultaneously, it can also read the magnetic strip on a previously printed ATB ticket. The potential is therefore in place for a travel agent to have just one ATB printer in the office that can print and process both air and rail tickets.

Clearly therefore, one of the long term objectives of ATOC is for travel agents to use a single printer for producing all UK rail tickets. This will enable a single ATB printer to be loaded with a set of airline ticket stock and a set of rail ticket stock. The GDS systems use special software to control contention between the various workstations that need to print a ticket. Contention occurs, for example, when Workstation 1 initiates an airline ticket printing command at the same time that Workstation 2 issues a rail ticket print command. This special contention handling software makes it possible to use just a single ATB printer at the point-of-sale. This is important because ATB printers can be quite costly. Looking even further ahead it may one day be possible

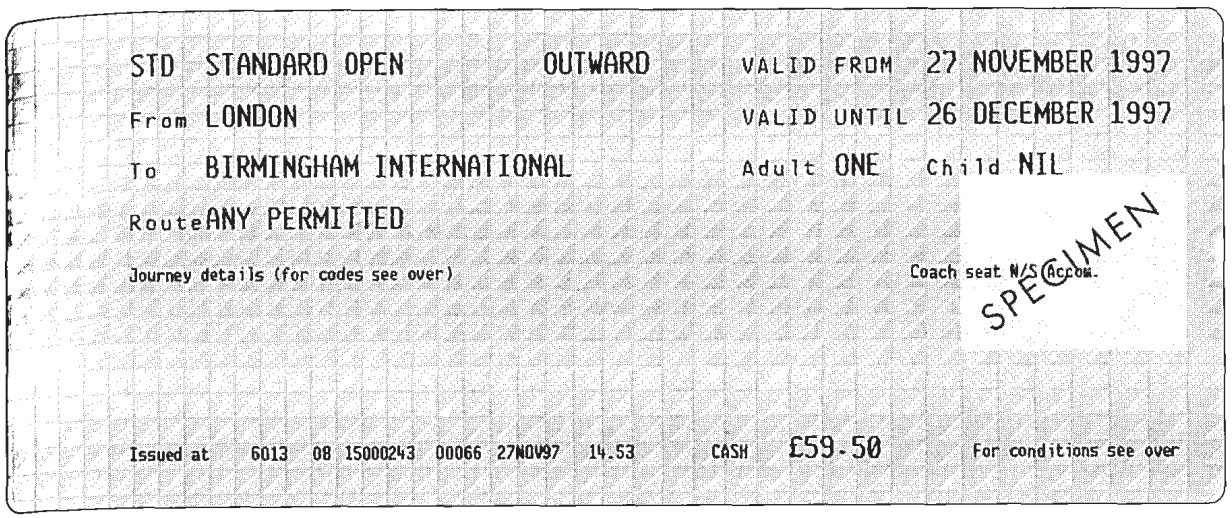

Figure 3.7 A rail ATB

for a single stock to be used for both airline tickets and rail tickets. However, in order for this to happen, there will need to be a lot more work done in the standards area. Because this is all organized by committees from leading airlines, rail companies and other travel suppliers, it may well take some time to agree such standards.

The ticket printed by the TSG system is for a maximum of three legs or sectors of an itinerary. More sectors can of course be ticketed but these will require more than one ATB. So, for example, a five-leg journey would have Legs 1, 2 and 3 printed on the first ATB and Legs 4 and 5 on the second. Standards are a critical issue for industry systems as I am sure you will have gathered from the section in Chapter 1. ATOC has adhered to the international union of railways (UIC) and rail combined ticket (RCT) standards for European ticket issue. This means that tickets produced on UK rail systems will be acceptable on the continent and can be read and processed by other non-UK systems. Incidentally, the rail printer will also be capable of printing credit and charge card forms. These will comprise a portion for use by the card company and a tear-off slip for the customer. This will no doubt be a valuable time saver for most travel agents.

In terms of GDS connectivity, the rail system is accessed via a special partition within the GDS multi-access capability. There is a GDS language entry that a user must enter into the GDS terminal in order to request seat and sleeper reservations. This is converted by the GDS system into the appropriate rail system entry (the rail system uses an alternative format to the airline systems), and transmitted via telecommunication lines into the main-frame computer in Nottingham. The rail system response on this return half of the dialogue is not converted but instead appears in native mode on the travel agent's GDS system display.

- *ATS* ATS is a 'stand alone' PC software package that has been provided to travel agents since 1991. ATS produces train tickets on continuous stationery and supports automated settlement of ticket sales to RSP. It is primarily for travel agents who have rail ticket sales of up to £0.5 million per year. The software is currently used by around 150 travel agencies. To use ATS the travel agent needs to have a dot matrix printer attached to their PC. This printer is loaded with continuous rail ticket stock that is very similar to OPTAT airline ticket stock in size and format. The main difference is that this ticket stock comprises just three parts: (i) a travel copy, (ii) a copy for the travel agent,

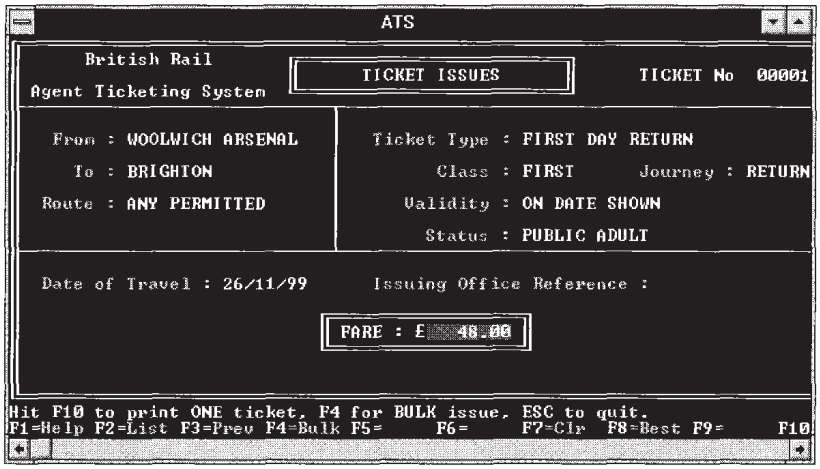

Figure 3.8 An ATS screen

and (iii) an audit or accounting coupon. The main menu offers the following set of functions: ticket issue, ticket cancellation, back-up sales data, daily sales report and best-seller input. There are also parameters that control ticket stock, accounting periods and VAT codes. The principal function is, however, the issue of rail tickets and this is therefore explained in more detail below.

The first question the ATS system (Fig. 3.8) asks the user, is to verify that the number of the next ticket to be printed tallies with the ATS PC stock records as displayed on the screen. Once this has been confirmed the ticket issuance process starts. The system works most effectively when it has been set up with details of the most frequently used itineraries. There may be up to 50 such itineraries and each is pre-set with: from city, to city, fare, class, etc. When a ticket is required from the best-seller list, the agent selects the route, adds the date and a reference and the ticket is printed automatically. If the journey is for a non-best-seller itinerary, the agent simply enters all the details that are required on the ticket, such as from city, to city, class, fare (from the rail tariff book), date and reference. Finally, when all data have been entered the ATS system may be instructed to print the ticket.

The details of all tickets issued for a day are added to a data base, which forms the basis of the end-of-month rail sales return. Each month the system produces a floppy disk that is mailed to RSP along with a copy of all the audit coupons of the tickets issued for the month. This saves a great deal of manual effort and totally eliminates the need for a hand-written rail sales return. It is also possible to print consolidated daily and monthly sales reports for all tickets sold by the agency.

The ATS system also interfaces with Galileo's President Agency Management System (PAMS). This is achieved using a connection from the serial port of the ATS PC to the serial port of the PAMS PC. This connection allows a MIR to be transferred from ATS into PAMS for every ticket issued. A MIR contains all the information needed by the PAMS back-office system to process the sales ledger functions (including the automated printing of customers' invoices) and other accounting tasks associated with rail ticket sales. This makes it possible to capture some basic accounting data at the point just prior to the ticket actually being printed. Information such as client account number, cost centre, product code, method of payment, credit card type and card number. This saves the travel agent's back-office accounting staff from having to re-key the ticket information already keyed at the point-of-sale into PAMS and then having to add other customer account information.

Retail servicing points

There are many different places where information on train services are required by customers. For example, there are the telephone sales centres scattered around the country. There used to be 45 of these telesales centres although they are being rationalized at the direction of the rail regulator and eventually there will only be around four large telesales centres and six smaller units. Rationalization has resulted in a new consolidated NRES. This is accessible via the telephone using a single national number charged at local call rates. But there are other retail servicing points besides NRES, such as travel agents that do not necessarily sell rail tickets, small stations and rail shops. The main systems used to provide train operating information to these retail servicing points are:

- **Tribute** This is a PC-based software product. It performs certain rail related functions locally and also uses ISDN telecommunications to connect into the rail main-frame computers in Nottingham. This provides its retail servicing users with the power of a local PC system but with the enormous resources of a main-frame just a phone call away. An important IT architectural feature of Tribute is co-operative processing.

  The term co-operative processing means that Tribute's system functions are provided by a team of computers working together and sharing the workload. Tribute uses co-operative processing techniques because it shares the total processing workload between its host PC and the remote rail main-frame computer. It therefore closely resembles an airline GDS. The screens that the user sees and interacts with are based on main-frame responses but these are enhanced locally by Tribute's special PC software. The resulting screens are extremely user friendly and are similar in appearance to the Microsoft Windows format that is by now so familiar to many PC users.

  SEMA plan to migrate parts of the data base held on the Nottingham main-frame to the local Tribute PC hard disk. Processing and storage functions within Tribute would then be increasingly shared between the Nottingham main-frame and the local PC. The fares data base, for example, will be split into two parts for storage and access purposes. Local fares will be stored on the user's PC and refreshed each night via the main-frame link, while all other fares will be stored only on the main-frame and accessed as needed. This should help take the load off the central main-frame and make Tribute more responsive. Another main-frame support functions accessed by Tribute include FACETS. FACETS combines the CPF fares system, the CATE timetable system and the British Rail CRS reservations system.
- **CATE and FACETS** These are the timetable and fares systems that run on the Nottingham main-frame. They are accessed from high volume rail servicing points by dedicated terminals connected by leased lines to Nottingham.
- **The customer information system (CIS)** This is located on station concourses. It shows departure details of trains leaving from a station within the next hour and in some cases also shows arrival information.
- **Rail planner** The rail train timetable has been computerized for some time. It is stored as a very large data base, comprising some 89 Mb of data storage, held on the main frame computer in Nottingham. Until 1992 this timetable was only available in the form of a large and somewhat complex book known as the *British Rail Great Britain Timetable*. The principal aim of Rail Planner is to simplify the planning of customers' journeys by providing local access to this timetable data base.

  Rail Planner is another 'stand alone' PC based software product (Fig. 3.9) that allows users to plan their journeys simply by specifying their origin/destination requirements. This is achieved by providing the entire rail timetable on a PC data base, which is compressed so that it occupies only 1.8 Mb of PC hard disk space. This has been done by using special software and a user friendly man/machine dialogue. Rail Planner is available in two options: (i) Rail Planner software plus a timetable data base supplied twice each year, or (ii) Rail Planner software with a timetable data base that must be updated each month with changes. The core element of Rail Planner is the timetable data base that, with its monthly refresh

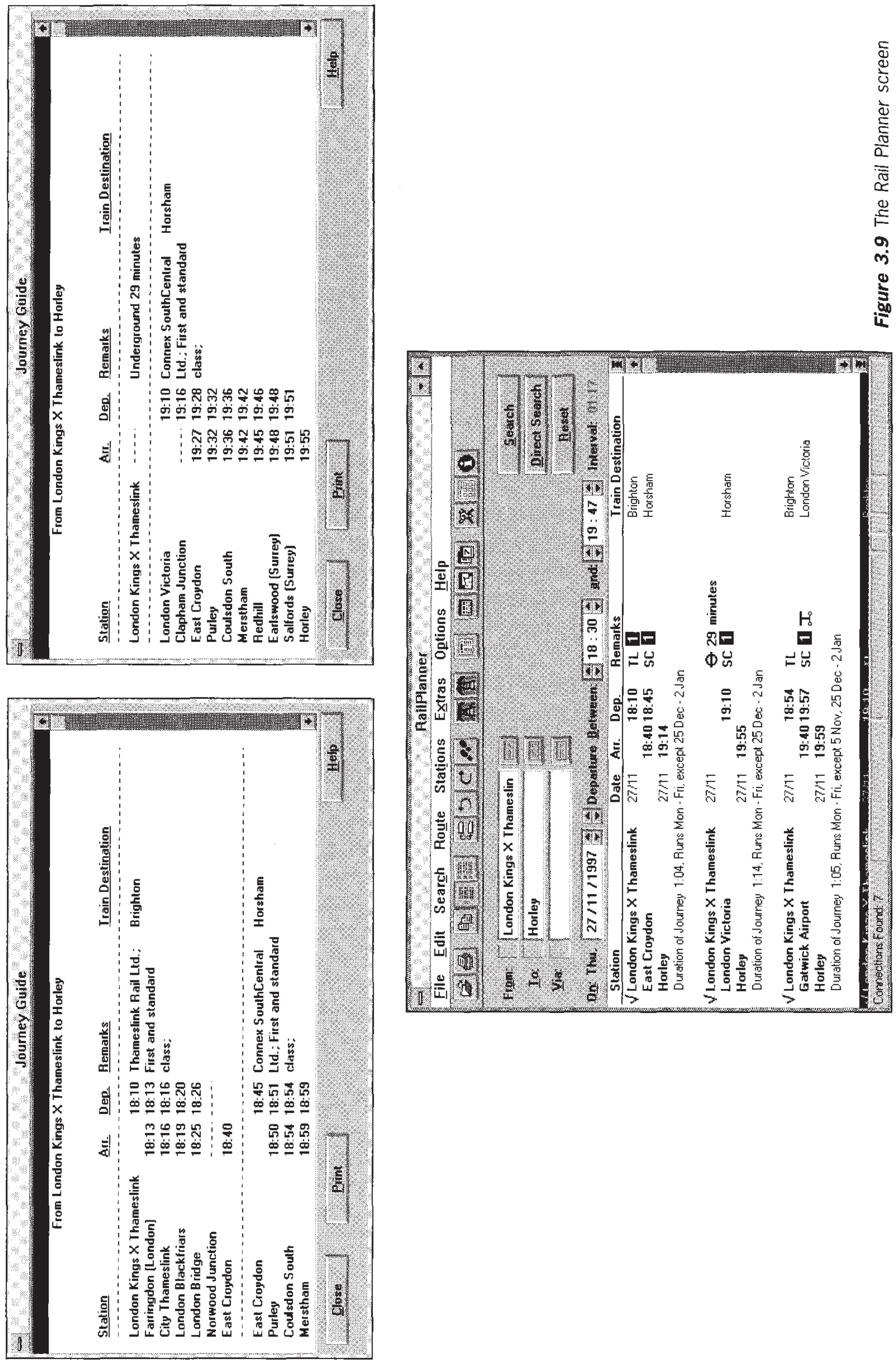

Figure 3.9 *The Rail Planner screen*

function, is close to being as accurate as the timetable data base stored on the main-frame.

Rail Planner is a Windows-based product and uses familiar GUI standards. The user simply enters the from and to cities, the date of travel and the approximate departure time. The system responds with a display of the itinerary showing the intermediate stops and train changes *en route*. Also displayed are several earlier and later options that may be of interest to the traveller. When the route has been finalized, a map option may be requested. This pictorially shows the chosen route with major stations and all interconnecting points. The map can be printed and handed to a traveller. Rail Planner has been available from British Rail since September 1992 (when it was branded Journey Planner). The software was originally supplied by a German company and has now been modified for use in the UK. The system is distributed on floppy disk and is mainly used by individual travellers and corporate travel planners.

Central accounting functions

One of the main functions of the RSP is to ensure that the revenue derived from rail ticket sales is distributed equitably between all the train operators and other third parties, e.g. the London Underground. The SEMA group undertakes this task on behalf of RSP using several large mainframe computer systems, the main one of which is called CAPRI. CAPRI is fed with ticket sales data from the various point-of-sale systems that I described above. However, the revenue allocation process is not as straightforward as you might think. Let's consider the logistics in a little more detail.

First of all, the details of the actual routes that the passengers travelled may not automatically be derived from the ticketed sales data generated from the points-of-sale. The UK rail network is sufficiently large and diverse to enable travellers to take alternative routes between their origin and destination points. So, it is not always possible for the revenue accounting system to calculate how a ticket's sales value should be split between two or more train operating companies on the basis of the route actually travelled. Instead, a set of rules have been laid down for each ticketed route that allows certain assumptions to be made regarding the allocation of ticket sales revenue. As you can imagine, with over one-quarter of a billion tickets sold each year, this is a job that is only feasible to perform using a large and powerful computer.

Once the ticket sales transaction data have been analysed, the CAPRI system determines the share attributable to each train operating company and also calculates the commission due. It then determines the amounts payable to third parties such as the London Underground and ferry companies. The end result of this process is a set of entries that are passed into the books of account of each train operating company.

Rail sales distribution

An enormous volume of rail tickets is sold in the UK each year, i.e. over one-quarter of a billion tickets annually, but compared with other travel industry suppliers, only a small proportion are sold via travel agents. One reason for this is that travellers tend to buy their tickets from the station as they depart. Another possible reason is that from the travel agents' perspective the revenue on a British Rail ticket is usually perceived as being rather low for the average journey, especially when the rather laborious monthly manual settlement procedure is taken into account. In fact, the average commission rate on rail tickets is some 9 per cent, which is actually quite competitive with domestic air travel.

Once again, business travel is a little different and most business travel agents will offer their corporate customers British Rail tickets. The reason for this is twofold: (a) it provides an all round service and gives a better and more caring image to the customer if a comprehensive range of products can be provided, not just the profitable ones; (b) business travellers often travel first class and the journeys are usually long distance, all of which means that the revenue earning potential of these type of British Rail tickets is in fact quite attractive. For this reason therefore, some travel agents do carry a stock of British Rail tickets.

The sale of rail tickets that are sold via travel agents is, however, set to increase significantly in the not too distant future. In fact, it is expected

that the total volume of rail tickets booked through the UK travel trade will more than double by the end of this decade. This is primarily due to the channel tunnel, which opened in 1994, and the commencement of Eurostar and Le Shuttle, both of which provide new high speed surface links to the continent that challenge air and ferry services.

In summary, if travel agents are to be encouraged to sell UK domestic rail tickets and the new cross-channel products, it is imperative that they have access to efficient and cost effective sales and ticketing technology. Rail companies are therefore developing some very sophisticated supporting technology that should make the sale of most rail tickets highly profitable for travel agents and lower the cost of direct sales.

Information suppliers

Information is the raw material of the travel and tourism industries. There is an enormous number of travel suppliers and each one describes their products using a wealth of data; and besides travel suppliers there is a whole set of reference information that the industry and travellers themselves need if they are to travel the world safely and effectively. Unfortunately, these data and their assembly into useful information are scattered across many different companies and sources. Life would be a lot simpler if information on travel and tourism was stored in just a single place and easily accessible from anywhere in the world. This ideal is, however, unattainable at the present time, although the future holds the promise of new technologies that could rationalize data sources and standardize the way we access and use information. It is therefore essential that we explore companies that specialize in the accumulation, storage, distribution and provision of information to the travel and tourism industries. Probably the leading company in this field is the Reed Travel Group.

REED TRAVEL GROUP

Reed Travel Group is a member of the Reed Elsevier plc group, a world-leading publisher and information provider in the areas of scientific, professional, business and consumer publishing. With its principal operations in North America and Europe, Reed Elsevier has annual sales in excess of £3 billion and employs more than 25,000 people worldwide. Reed Travel Group is the world's largest independent provider of travel information products and services to: (i) business travellers, travel planners and the global travel industry; and (ii) GDS and airlines. The Reed Travel Group mission statement is:

> 'To be the preferred supplier to the global travel community of: (a) comprehensive, impartial information; (b) essential news and opinions; and (c) effective solutions and knowledge. Our corporate culture will inspire and empower employees to provide our customers and associates with products and services of superior value and to deliver a fair return to our shareholders. We will be good corporate citizens with respect to the communities and environments in which we work.'

With more than 2,500 employees in more than 50 offices around the world, Reed Travel Group's businesses serve all the major global travel markets including air transportation, hotel, cruise, meetings, leisure, cargo, rail and other travel sectors. Although I won't be covering all of these products and services in this book, there are several that are very relevant to the effective use of IT in travel and tourism, which I will be exploring in a lot more detail in this and other chapters.

Reed Travel Group's leading business portfolio includes: OAG, *Travel Weekly*, *Meetings & Conventions*, *Hotel Travel Index*, TravelNet, Weissmann Travel Reports, ABC Corporate Services, Reed Travel Training and Utell International. The company's products are distributed globally and the business operates from centres in the UK, USA and Singapore. Reed Travel Group's products and services serve many different markets: (a) travel principals, such as airlines, airports and hotel/car companies; (b) the corporate market, including travellers, travel arrangers and buyers; (c) travel intermediaries, such as travel agents, CRS, GDS and freight forwarders/cargo agents; and finally (d) USA Government departments, including the Federal Aviation Administration and Government travellers. The complete range of products may be categorized as follows:

- **OAG** This encompasses the print and electronic travel information products and services that are offered to travellers, corporations and the travel industry. These publications supply the information needed to make effective travel decisions. OAG and its electronic products are described in more detail below. The specialist GDS fares and schedule distribution service (known, respectively, as OAG Genesis and OAG Direct) are described earlier in this chapter (see the Fares Distribution section above).
- **Utell International** This is the world's largest hotel marketing, sales and reservations service promoting 6,500 hotel members in more than 180 countries. This service is described separately in Chapter 4 – Distribution Systems.
- **Weissmann Travel Reports** This is a leading provider of global electronic and hard copy destination information to the travel industry. Its data base includes destination information on more than 10,000 cities throughout the world and is available by country profile, state/province profile, city profile and cruise port-of-call profile. It is particularly relevant to IT in travel and tourism because it is a source of information for many Internet sites, some of which are described in Chapter 5 – The Internet.
- **Travel Weekly** This is the leading travel trade newspaper in the USA. Published twice weekly, it provides late-breaking industry news, features and practical information for travel agents and the travel industry as a whole. Several other travel related publications also are included in the portfolio. I have not, however, covered this aspect of Reed Travel Group's business in any more detail in this book.
- **TravelNet** A leading real-time travel booking tool, with advanced data base software, that enables companies to manage and reduce travel expenses. TravelNet, simplifies the travel planning, booking and management process by providing a company's employees with the ability to book air, hotel and car rental reservations from their personal computer. This product is explored in more detail in Chapter 5 – The Internet.
- **Reed Travel Training** Courses are offered for travel agents, travel arrangers and administrative assistants. Reed Travel Training is endorsed by IATA and the Universal Federation of Travel Agents' Association UFTAA. I do not cover these training products in this book.
- **Hotel & Travel Index** This is a leading hotel directory providing up-to-date booking information on 45,000 hotels, resorts and inns world-wide. Published quarterly, *Hotel & Travel Index* contains all pertinent hotel information including rates, accommodation details, contact names, addresses, toll-free phone and fax numbers, representatives and commission policies and GDS access codes. These products are not covered in more detail in this book.
- **ABC Corporate Services** This is the original provider of quality corporate services for independent travel agencies. The company's primary products include: (i) *Premier Hotel Plan*, a comprehensive programme including negotiated rates, value added amenities and block space; (ii) *Business Breaks*, a meetings' facilities guide for corporate travel planners; (iii) the travellers' emergency service system (TESS), a 24-hour emergency hot-line; (iv) an international rate desk and (v) Global Connect, a global travel management network. These products are not covered in more detail within this book.
- **EasyRes** A leading viewdata-based reservations system for leisure travel agents in the UK, offering free and easy access to a wide choice of airlines and fares, last seat availability, hotels and car rental booking facilities. The EasyRes service is presented in more detail in Chapter 6 – Communication Networks.

As I have mentioned before, information is the raw material of travel and tourism. Insofar as Reed Travel Group is concerned, this raw material is a prime company asset. It is an asset that is represented, at its lowest level, by collections of individual data items. These data items are stored in a way that enables them to be combined in different representations and this is what we call information. The core data base, which forms the basis for so many of Reed Travel Group's information products, is stored on a main-frame computer using relational data base management software. One of the simplest ways in which this data base is used is in the production of the OAG reference

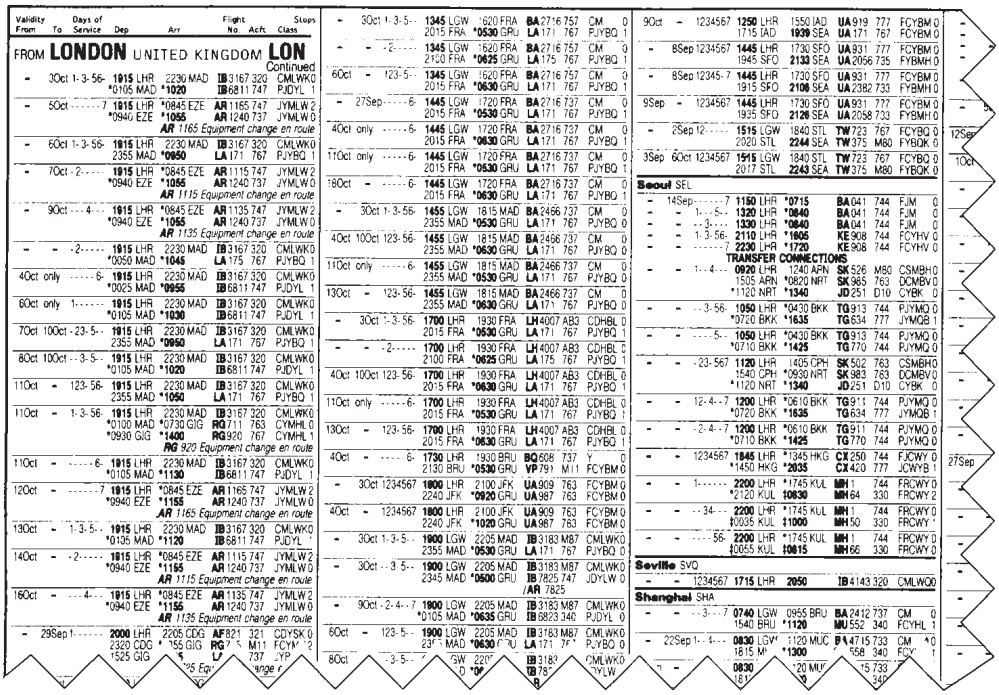

Figure 3.10 A sample page from the OAG *World Airways Guide*

books. This is, therefore, a good place from which to start our review of Reed Travel Group's IT products for travel and tourism.

OAG

The OAG publications have, for many years, served as the ultimate reference source for travellers, companies and travel agents. The core product is a book that contains the airline fares and schedules. The data base that is used to produce this book forms the basis of many other products and services marketed to the travel industry by the Reed Travel Group. So it is worthwhile spending a few moments on the OAG *World Airways Guide* before I explore the electronic products in more detail. After all, the OAG *World Airline Guide* is a very important reference source used by most travel agencies and many companies whose people travel extensively on business.

The OAG *World Airways Guide* is published monthly by Reed Travel Group. Its purpose is to provide a reference source for direct flights, transfers and connections between the world's airports. In other words, it shows you all the various ways in which you can get from A to B. The OAG *World Airways Guide* is published in two editions: (a) a travel trade edition, which – in addition to schedules – includes airline fares information; and (b) a corporate edition, which includes information on ground transport and destination information as well as health, visa requirements, public holidays, business hours, business hints and general travel information. It has become the standard reference for efficient travel planning with over 480,000 users spanning 180 countries of which 190,000 are travel agents and 200,000 are in the key corporate sector.

The OAG *World Airways Guide* contains details on all the 650,000 scheduled airline flight sectors in the world. Because there are more than 760 airlines and each has a route structure and timetable of its own, you can begin to appreciate the size and complexity of the publication. The OAG *World Airways Guide* shows every single flight sector operated by every airline, from each city airport to all other cities. Each of these sectors is described in detail, including, for example, the days of the week that the flight operates and the times of departure and arrival, the aircraft type and the class of seats available. An example of a page from the OAG *World Airways Guide* is shown in Fig. 3.10.

The OAG *World Airways Guide* also has different sections that describe the airports of the world and the cities and countries in which they are located. There are sections on all airlines and on travel by air in general. All in all, the OAG *World Airways Guide* is an essential reference source for a travel agent or traveller and, in fact, most agencies have at least one copy readily available. But the guide is used extensively also by business travel planners and by business travellers themselves. In fact, Reed Travel Group publish pocket editions of the OAG *World Airways Guide* that are known as the OAG *Pocket Flight Guide*. There are four pocket editions, which cover: (i) North America; (ii) Europe, Africa and the Middle East; (iii) Latin America and the Caribbean; and (iv) the Asia Pacific region. These guides have a total combined circulation of some 300,000 world-wide. There is also the *Africa Flight Guide*, which is published locally.

Historically, in the pre-CRS days, the OAG *World Airways Guide* was the first thing a travel agent used to arrange a customer's airline itinerary. The process went something like this: (a) the travel agent would take down details of where the customer wished to travel and the cities that needed to be included in the itinerary; (b) the OAG *World Airways Guide* would be consulted and the first city would be looked up to find the flights from that city to the next one on the customer's itinerary; (c) if there was no direct flight from that city to the customer's next city on the itinerary, then a combination of the atlas and the OAG *World Airways Guide* would be used to identify the next nearest city; (d) the process would be repeated until the flight details of each city pair had been ascertained and noted; and then finally (e) as far back as 1959, the agent had to give the details of all flights to the first airline on the itinerary, which would make all the reservations in the list. Quite a lengthy process as you will, I hope, by now appreciate.

So, when CRS terminals began to appear on travel agency desks, they changed the way in which the OAG *World Airways Guide* books were used. This is because the CRSs have most of the information built into their data bases and provide a 'look and book' facility. The OAG *World Airways Guide*, on the other hand, while not being able to offer this transactional facility, still has an important role to play in a travel agent's operation. It does this by continuing to offer a unique, reliable and fully comprehensive source of unbiased world-wide scheduled flights and transfer connection information that is updated and published monthly in chronological order. There are also many other sister publications that are too numerous to cover in detail here. For example, there are the following, although please bear in mind that this is not a comprehensive list, but simply a list of particularly relevant publications:

- OAG *Guide to International Travel* A hard-copy directory containing destination information on visa, health, passport, customs, currency and local business hints. Also includes information about major airports, cities and general travel related information.
- OAG *Agents Gazetteer* A set of six hard-copy reference books for UK travel agents containing unbiased information and reports on accommodation properties, key leisure destinations and resorts world-wide.
- OAG *Air Travel Atlas* Provides an easy to use guide on routes for all domestic and international scheduled flights world-wide. It also contains full coding structures for airlines, airports and cities. This publication is updated twice each year.
- OAG *Rail Guide* A portable hard copy directory of UK rail services in London and the South East plus Eurostar services. First published in 1853, it is the only guide with timetables and fares combined.
- OAG *Travel Planner* A desk-top reference guide listing hotel information, destinations and transportation information. It includes city maps and airport diagrams and is published quarterly.
- OAG *Cruise & Ferry Guide* A hard-copy directory that provides essential information on cruise itineraries and ferry schedules world-wide, including ocean, river and waterways, as well as cruise ship and ferry profiles. Updated quarterly.
- OAG *Holiday Guides* A set of four hard-copy reference books for UK travel agents containing details of programmes featured by all bonded, commission-paying UK tour operators.

Table 3.3 OAG FlightDisk functions

Function	*Description*
Airline schedules	Around 650,000 world-wide flight schedules including direct and transfer flights for domestic and international routes
Itinerary planner	Comprehensive itinerary planning and storage
Print	A facility for printing selected travel information and personalized itineraries
Notepad	An electronic jotter for temporarily storing flight details while planning complicated itineraries
Directory	Additional information covering aspects of travelling abroad such as health, currency and destination details
Files	A private store for the travel planner's own information relevant to a company and its travellers
Help	Comprehensive on-screen help

However, even in the era of automated systems like GDSs, the OAG *World Airline Guide* still has a sometimes crucial part to play in arranging travel itineraries. Take the following example. A friend of mine was planning to spend some time in St Malo and during his stay there, wanted to fly to another town in France for a short business trip. He visited the local travel agency to enquire about possible flights. The travel agent first used the GDS to make an enquiry but this drew a blank. There were no direct flights or connecting flights shown in the GDS data base, from St Malo. So, the agent pulled down the OAG *World Airways Guide* and together with a rather dog-eared atlas, began to search for the nearest city to the desired destination and an appropriate airline and flight. Eventually, this was successful and my friend was sent on his way with an appropriate airline ticket. So, I hope you can see from this little example that the OAG *World Airways Guide* book still has an important role to play in a travel agent's operations.

OAG's electronic products

In November 1991 Reed Travel Group decided to re-position its electronic products by using new optical disk and PC LAN technology. A brand new set of products was launched, the core of which is derived from the renowned OAG *World Airways Guide*. The new electronic product range is based on compact disk read-only memory (CD-ROM) technology; which has achieved substantial growth rates already, with increases forecast over the next few years. This technology was chosen by Reed Travel Group because the alternative – central storage and transmission of information – was considered too costly and time consuming. It would, for example, take a large number of floppy disks to store all of the OAG *World Airways Guide* data whereas just a single compact disk can store the same amount of information. CD technology, therefore, is characterized by the ability to store enormous volumes of data reliably that can be accessed quite quickly by relatively inexpensive PC devices. Nevertheless, if a user wishes to receive the product on diskette then this is also possible. The core electronic products are OAG FlightDisk and OAG HotelDisk.

Disk-based products

The disk-based products are designed for 'stand-alone' use and are implemented on a user's work-station or lap-top PC. To use either the FlightDisk or HotelDisk electronic products, users need a personal computer, i.e. 386SX or better, with a high resolution VGA colour monitor and a 3.5″ diskette drive *or* a compact disk device. It is the software in conjunction with the information on the disk that provides the interactive air and hotel displays. The information on flights and hotels is recorded on a floppy disk or on a compact disk, which looks just like an audio CD. Information

Table 3.4 OAG FlightDisk and HotelDisk LAN version hardware and software requirements

IT requirements	*OAG FlightDisk*	*OAG HotelDisk*
File server	Hard disk space: 12 Mb Microsoft Windows 3.11 or higher 3.5″ diskette drive or CD-ROM drive	Hard disk space: 12 Mb Europe 8 Mb Asia Pacific 20 Mb North America 40 Mb World-wide total Microsoft Windows 3.11 or higher 3.5″ diskette drive or CD-ROM drive
Workstation	PC with 386SX processor or better VGA monitor Microsoft Windows 3.11 or higher 4 Mb RAM Printer (optional)	PC with 486SX processor or better VGA monitor Microsoft Windows 3.11 or higher 4 Mb RAM Printer (optional)

cannot be erased or re-recorded on these CDs, so, when a new version of the disk is needed, a replacement disk is distributed by OAG. More information on these two core electronic products is given below:

- **OAG FlightDisk** OAG FlightDisk is updated monthly in the UK and twice each month in the USA (for LAN versions only – see below). It provides information on scheduled airline flights and transfer connections plus additional reference data on all aspects of travelling abroad. It also contains information on airports and ground transport facilities, destination information on more than 200 countries, vaccination and visa requirements, public holidays, banking and business hours, general business hints and local etiquette. When putting together a trip around a series of meetings the user simply keys in the departure and destination airports, date of travel, preferred timings and airlines. Then, based on these criteria, it will display the appropriate information and highlight the most suitable flights. The OAG FlightDisk product uses the familiar Windows GUI. The facilities available are as shown in Table 3.3.
- **OAG HotelDisk** A sister product also is available for hotels, which is called OAG HotelDisk. HotelDisk is updated quarterly and is aimed at travel arrangers within the corporate market. This works in a similar way to OAG FlightDisk but has the additional benefit of hotel maps that show hotel locations and enable users to see walking or driving distances at a glance. More than 46,000 hotels can be selected by name, location, quality rating, room rate or any combination of up to 30 different hotel amenities. All essential details that describe the hotel, its contact details and up to 30 amenities are shown on the HotelDisk display. Users can plot their homes and overseas offices on HotelDisk maps. This enables walking time and taxi distances between hotels and offices to be determined. Companies can store their negotiated hotel rates within HotelDisk. Although OAG FlightDisk and HotelDisk products are aimed principally at the corporate traveller, they could also be of great use to a travel agent.

LAN-based products

Both the OAG FlightDisk and OAG HotelDisk products are available in two basic versions: (i) a single-user version in CD-ROM and floppy disk formats, which is published each month and distributed to subscribers; and (ii) a LAN version, also published monthly, which allows a user with

many PC workstations to share a single source of OAG FlightDisk information on their servers. The first of these, i.e. the single-user CD-ROM/floppy disk-based product, is aimed mainly at corporate travel arrangers, who can access the disk from their desk-top or lap-top PC. This version has grown in popularity by 87 per cent since 1995. The second, i.e. the LAN version, is aimed mainly at the corporate buyer market, which comprises well or-ganized companies with the following characteristics: (a) they have many travellers who need travel information for pre-trip planning purposes, and (b) they maintain a high level of control over their travel patterns. In order to use the OAG FlightDisk or OAG HotelDisk products, the user needs the hardware and software shown in Table 3.4.

The LAN version includes a Gateway option, which can be customized by the corporate user. This allows a company to design its own home page through which its employees access the OAG electronic products. The home page may contain company branding and shows a main menu that includes the following options: (i) flight information, (ii) hotel information, (iii) company travel policy, and (iv) latest travel news. This allows a company to record its travel policy on the corporate server for reference by travellers and travel arrangers. Other menu items, such as travel related news, can be added as needed by the company. The system also provides the ability for an itinerary to be stored as it is built up and then displayed and printed at the end of the session. In fact, any page may be printed at any time during the use of the system.

The market for electronic travel information

The OAG FlightDisk and OAG HotelDisk products are sold by subscription and are aimed at the business travel and corporate markets. They are PC based and are not priced on the frequency of access. These products have therefore been a commercial success over the longer term as both travel agents and companies migrate to PC technology as part of the general office automation movement.

Also there is no need for travel agents to be concerned by the availability of the OAG disk products to businesses. The chief benefit of this product from a travel agent's viewpoint is that it has the potential to make the travel agent's life easier. In theory, a business customer would consult the OAG travel disk in order to help plan the trip. When a fairly detailed itinerary has been constructed in this way, the customer can telephone the travel agent with a request to book the required seats. This takes a great deal of the workload away from an agent. If only all bookings could be that simple!

Looking to the future, it is possible that developments in hand-held computers – known as 'palm-tops' – might make it feasible to have a portable OAG *World Airways Guide*. Either the data could be loaded directly into the palm-top's memory or, the data could be inserted on a high-capacity disk. We shall have to await developments in this new technology to know whether or not there is a demand for such a service.

Product distribution

It is technically possible for suppliers to distribute their products to travel agents directly. In the past this approach has been taken by some airlines, international hotel chains and car rental companies. They have provided selected travel agents and other high volume users with terminals connected by communication lines to their corporate mainframe reservation systems. Bearing in mind the expense of doing this, a direct connection approach is usually only provided to extremely high volume users, such as central reservations units operated by some of the major UK multiple travel agencies. However, if suppliers could provide travel agents or even consumers with direct access to their data bases, without any other system being 'in the way', then sales would arguably be maximized. However, providing agents with dedicated terminals connected to a single supplier system does have some drawbacks:

- **Single access** Only the largest of hotel chains and car rental companies provide direct access to their inventories as the airlines used to do. This is partly because the reservation systems used by hotels and car rental companies are not as heavily regulated as airline CRSs and GDSs and partly because their volume in rela-

tion to airline ticket sales are relatively low. So there have historically not been many common networks or distribution methods for these companies to use that can easily reach the travel agent, other than the airline CRSs and the more recent GDSs (although this is changing with the advent of the Internet). Consequently, at present you won't find many single company terminals used for airline, hotel or car rental reservations installed in travel agents. Most agencies now use GDSs. While GDSs are usually considered fine for general purpose supplier reservations from the agent's viewpoint, they are nevertheless, not so ideal from the supplier's perspective. This is because they show competitors' products and allow the buyer to compare prices and service levels easily. Ideally, suppliers would rather a potential consumer or agent communicated with them directly during the sales process. However, this is not so because the GDSs have, over the past ten years or so, stolen the high ground and now dominate the agency distribution channels at present. The Internet is changing this situation and this is explored in more detail in Chapter 5 – The Internet.

- **Focus on business travel** Air, hotel and car rental customers tend to be business travellers. The leisure traveller usually purchases a holiday package in which the hotel and possibly the car, have been obtained in bulk and factored into a package price. Business travellers on the other hand need to purchase these products on an *ad hoc* basis often at short notice. The problem from the supplier's viewpoint is how to reach the business travel agent or the corporate business traveller other than through a GDS. In the past there has been no real answer to this question. Only viewdata offered a potential alternative although there are substantial barriers, for example: (a) viewdata is principally a leisure travel technology, not ideally suited to business travel with its demand for high speed response; and (b) there are a lack of viewdata PCs in business travel agencies and companies. Once again, however, the Internet offers a very real alternative method for suppliers to establish a direct communications channel with their customers.
- **Relatively low revenue source for non-air products** Although hotel and car businesses are profitable, they are regarded by many agents as very much secondary to air sales. One reason for this is that it is difficult to track the commission due from hotel sales (although see Chapter 8 for a description of the commission tracking systems that overcome many of these problems). Each transaction is usually for a relatively small amount of revenue and the overhead involved in keeping tabs on which hotels owe what amounts for large numbers of bookings is a chore most busy travel agents can do without. A back-office system can help here but there really is not the same demand from agents for dedicated hotel and car system terminals, for this reason. In other words, it has not been economically feasible for suppliers to install their own dedicated reservations terminals in agencies. Instead, they have used the GDS route to travel agents.

The net result is that there are not many dedicated airline, hotel or car reservation terminals in travel agency locations. The bulk of the automated reservations come from the GDSs that co-host or connect to most of the major car and hotel systems. Nevertheless these travel supplier companies do market their own dedicated systems to a small niche within the travel agency population. The thrust of their marketing effort tends to be the very large business travel agents, the headquarters of some of the large travel agency multiples, some very large companies and the specialist hotel reservation centres whose sole business is making hotel reservations for agents, companies and the general public.

It is for these reasons that I shall not be covering dedicated airline, hotel or car systems in any detail in this book, i.e. single company terminal systems. In my view, most of what you need to know on this subject can be found in the GDS chapter and in the description of hotel distribution systems like Thisco and Utell. Finally, any opportunities for suppliers to distribute their products to travel agents, companies and consumers directly, although problematical in the past as described above, are now becoming realities with the advent of the Internet and Intranet technologies, which I address in Chapter 5.

4

Distribution systems

Introduction

In Chapter 3, I discussed how suppliers have used IT to run their businesses and support the sales process. The next step is to consider one of the ways in which these suppliers can distribute their products and services to consumers. GDSs are presently the leading distribution channels for most major travel suppliers. This is certainly true for airlines, hotels and car rental companies, all of which participate in GDSs. There has been a rapid rate of change within the GDS sector over the past few years and no doubt this will continue as new electronic distribution channels open up. But before we explore newer distribution channels like the Internet, it is very important to understand clearly how the established distribution systems work because they have been channelling the vast majority of travel products and services via travel agents to consumers in both business and leisure sectors of the market, for some years now. Incidentally, let me expand upon what I perceive as the difference between a CRS, a GDS and a HDS. These are important distinctions because the terms seem to be used interchangeably by many people in the industry.

- **CRS** A CRS is a travel supplier's own computerized reservation system. It is owned and operated by the travel supplier, although some CRSs may provide co-hosting services to other suppliers – rather like a kind of outsourcing arrangement for smaller travel companies. The term CRS is mainly used to describe an airline's own computer reservation system, usually a large main-frame computer. In order to connect to a CRS, travel agents used to have a dedicated dumb terminal that was connected only to a single airline's CRS computer, or in a minority of cases, a dedicated hotel reservation system. All other communications with other airlines were done via the airline to which the travel agent was connected.
- **GDS** A GDS is a super switch connecting several CRSs. Each GDS is powered by a large main-frame computer that performs many of the end-user functions that are delivered to travel agents using PC-based terminals. GDSs use a co-operative processing architecture in which some functions are driven directly by the GDS computer and some are controlled by the airline CRS selected by the end user. Most GDS computers have their own large data bases which are used primarily for the indexing and control of booking records.
- **HDS** A HDS is rather like a GDS that has been designed exclusively for the hotel business. At its core is a large computer system that often comprises several super-servers. These large servers can provide certain operational functions to hotels that access the HDS via on-line terminals. In addition to this, the HDS is connected to other hotels that have their own in-house reservation systems and to the major GDSs. In summary then, HDSs distribute hotel systems to GDSs.

GDSs were formed from alliances of several CRSs, each of which had its own airline backer. So, their original formation was to some extent influenced by intra-airline relationships as well as the technical architecture of each airline's CRS. Once formed,

there was a period of some consolidation and shake-out, after which four main GDSs emerged: Amadeus, Galileo, Sabre and Worldspan. In addition to these four major GDSs there are also four CRSs or smaller regional CRSs, each of which has its own particular niche. We are still witnessing the next stage in the GDS's life cycle. This is the gradual distancing of the parent airline owners from the GDSs they originally created. The degree to which GDSs become truly independent of their airline creators remains to be seen. But let's take the first step in our exploration of GDSs and discuss in a little more detail, exactly what a GDS is and is not.

WHAT IS A GDS?

The term GDS is used primarily to describe the systems that travel agents use to book airline seats for their customers. Most of the world's major GDSs are therefore owned by airlines and most travel agents are connected to one of the four major systems (more on that later). But in fact, GDS technology is also used within the hotel industry to distribute accommodation services to travel agents and consumers. The common technological thread running through both types of GDS is the so called *switch*.

In this context a *switch* is simply a computer that is connected on the one side to many different supplier systems and on the other side to many different end users. The systems connected to the supplier side of a switch are generically known as *host systems*. The end-user side of a *switch* is more varied. End users of a *switch* comprise travel agents, consumers and other distribution networks that themselves make the supplier services available at the point-of-sale. So, it is possible for these *switches* to be inter-linked and in fact, many of them are: it is this inter-linking that makes the whole subject of *switches* and GDSs so complicated.

For historical reasons, the airline GDSs currently 'own' the travel agent distribution channel. The reasons for this are as follows. It was the individual airline CRSs that started offering their reservation terminals to travel agents, many years ago. At this time, the hotel industry was only just getting established in the field of marketing automation. In those early days of travel and tourism technology, hotels were focusing on building computer systems to maintain and control their inventory of rooms and associated accommodation services. So, by the time hotels were sufficiently developed in the area of computerized room inventories and reservation systems, the airlines had already sewn up the market for terminals in travel agencies. Also, airline ticket sales have always been both: (a) high volume, and (b) high revenue earners for travel agents. So, it made sense for travel agents to invest in a technology that maximized their airline sales productivity.

Hotels therefore found themselves in the position of having to connect their reservation systems into the airline GDSs in order to reach the travel agent. But this threw up further challenges for the hotels. It meant that in order to reach a global spread of travel agencies, they were required to connect to several different GDS switches. The problem is that each GDS has different interconnection requirements. So, the cost incurred by a hotel in connecting its reservations system to multiple GDSs was quite significant. This is why hotels have banded together and created their own special type of GDS.

So, let's first start with a review of the airline GDSs. Although similar in concept, each one has its own individual characteristics. That is why I have included all four major GDSs in this section. A good understanding of each one of these is critical to several other distribution technologies that I cover in other sections of the book; then, once you have a good understanding of airline GDSs, we can go on to look at hotel distribution systems (HDSs), what their objectives are and how they work.

Airline GDSs

Airlines distribute their products, i.e. airline tickets, to customers via several channels. The cost of doing this represents one of the major portions of an airline's bottom line expenses and is therefore a major determinant of profitability levels. To illustrate this, airline distribution costs average around 18.2 per cent of an airline's total expenditure on international services (*source*: Pierre Jeanniot, IATA Director General, 3–6 November 1996): a great proportion of these costs are directed at electronic

distribution systems or GDSs. An airline GDS is a *switch* that connects several airline CRSs to travel agents. However, the use of the term switch rather underplays the functions that are provided by airline GDSs. For a start they do a lot more than just switch message traffic between CRSs. Most GDSs also provide a great deal of functionality themselves, for instance, PNR consolidation, common language interfaces and the control of remote ticket printing; and the networks that some of the GDS switches use, are massive wide-area networks comprising thousands of telecommunication lines and dedicated switching computers that span the globe.

Historically, the principal GDS customer has always been the travel agent, with just a handful of large companies also using the system. However, with the advent of the Internet, the consumer has joined the ranks of the GDS customer base. What both sets of customers are looking for is access to supplier systems that provide travel products and services, and this is where the GDS world starts to become segmented. In the USA, 80 per cent of all travel bookings are accomplished perfectly satisfactorily using a GDS system. However, in Europe and other parts of the world, only 20 per cent of all bookings are done via a GDS. The reason? Well, in the USA, most people travel by air and sometimes stay in a hotel or rent a car. In Europe, people travel a lot more by other means, such as rail and ferry. Also, package holidays are far less important in the USA, whereas in Europe they are a large part of the travel market.

In the early days of CRSs the terminals were offered to travel agents by the airlines themselves. These were the bad old days of bias where airlines deliberately showed their own flights at the top of the list when an itinerary was being developed in a CRS by a travel agent. However, along with deregulation came a dictate that no CRS could bias its system either in favour of its own flights or indeed against those of its competitors on an identical itinerary. This took the sting out of the CRS as a principle marketing tool for the airline business itself.

Over the following years, airline systems became ever more sophisticated and more importantly, CRSs became almost indistinguishable in terms of the functions offered, i.e. the core airline booking functions, such as last seat availability. More recently, airlines are beginning to devolve themselves of GDS ownership. This has occurred principally because trading block bodies such as the EC consider it unfair for large airlines to influence their sales to consumers unduly as a direct result of their size. For example, mega-carriers can invest substantial sums in GDSs and thereby enjoy an advantage over their smaller competitors who cannot compete on resource grounds alone. All this has been done in the interest of the consumer.

However, there are still some carriers who participate in GDSs but block some of the functions of their systems when accessed within their home market. This is usually when the airline distributes its own CRS within its home market. In such cases, this action tends to boost the usage of the CRS and hence the sales of the airline that distributes it. Because this occurs in only the minor markets of the world, it is not a significant point. What is significant is that generally speaking, airline reservations functionality is virtually a level playing field for all airlines. This is especially true in terms of the way in which airlines participate in GDSs.

So, all of these factors have changed the way in which both the airlines as suppliers and the travel agents as intermediaries view the GDSs of the world. It is for these reasons that GDSs now compete for travel agency users far more, using factors such as geographic distribution, richness of functions, access to non-air suppliers, reliability, customization and so on. Airlines focus on increasing revenues by improving their core service and GDSs focus on increasing revenues by attracting more users and generating higher booking volumes for which they derive a booking fee from the recipient airline.

The initial focus of GDSs was to provide travel agents with a single reservation system to support the sale of airline seats and related travel products, such as hotel and car hire, via a single computer terminal, usually a PC. GDSs require a massive investment because they are extremely large computer systems that link several airlines and travel principals into a complex network of PCs, telecommunications and large main-frame computers. There are therefore very few GDSs in the world today. Some say that eventually there will only be two or three GDSs in the next decade as more

Table 4.1 The world's major global distribution systems

GDS	Terminals	Locations	Countries	Airlines	Hotels chains	Properties	Cars
Amadeus	168,000	39,000	117	440	268	35,000	55
Galileo	128,000	33,000	66	500	208	37,000	47
Sabre	130,000	30,000	64	400	215*	35,000	50
Worldspan	39,101	15,000	45	414	182	26,000	40

*Sabre's hotel chains exclude chains within chains

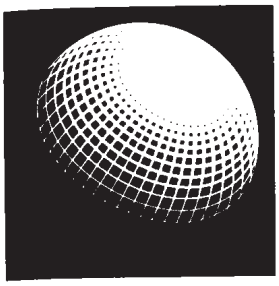

Figure 4.1 The Amadeus logo

mergers take place and more strategic alliances are formed. Table 4.1 shows some statistics that characterize the world's major GDSs.

In the following sections you will find a presentation of all four major GDSs: Amadeus, Galileo, Sabre and Worldspan (plus a summary of Infini, a Far East GDS). They are presented in alphabetical sequence and hopefully in a completely unbiased way.

AMADEUS

Amadeus (Fig. 4.1) is now the largest of the world's four GDSs. Its 168,000 terminals are used in over 39,000 travel agency branches and 8,500 airline sales offices around the world. It serves 117 countries and employs a total of almost 43,000 staff. Amadeus is connected to 440 airlines (of which 102 are directly connected), 268 hotel chains (representing over 35,000 properties) and 55 car rental companies.

Amadeus Global Travel Distribution was formed in 1987 by Air France, Lufthansa and Iberia. In April 1995, Amadeus Global Travel Distribution acquired the System One CRS from Continental Airlines of the USA. It is now a global GDS owned by its founders, with Lufthansa, Iberia and Air France each holding 29.2 per cent of the shares and Continental the remaining 12.4 per cent. In addition to these owners, Amadeus has over 32 partner airlines, each of which is directly connected to the Amadeus system. The company has a decentralized organizational structure, with its headquarters and marketing functions located in Madrid, Spain, its development activities in Sophia Antipolis, near Nice in France, and its operational centre in Erding, near Munich, Germany. National marketing companies (NMCs) are located in each major country. It is worthwhile exploring the components of this structure in a little more detail before we dive into the Amadeus system functions in more detail:

- **Amadeus Global Travel Distribution (Holdings)** Based in Madrid, this group supervises the group's activities and co-ordinates the subsidiary companies. It is responsible for the definition of corporate and financial strategy and goals as well as controlling the financial and legal obligations of the Amadeus group.
- **Amadeus Marketing** Responsible for all product marketing related functions, this group also co-ordinates the activities of all Amadeus NMCs in each country. It controls the flow and distribution of income between the service providers, the NMCs and Amadeus product marketing and management. Another set of key functions comprises the documentation, training and help-desk functions for NMCs, airline users and service providers.
- **Amadeus Development** This is the central systems development group and it is based in Sophia Antipolis. It designs, develops and tests

all Amadeus Central System software and provides a maintenance function for the group. Besides the central system, Amadeus Development is responsible for the AmadeusPro workstation products. In general, this group is charged with research and development activities for new Amadeus products.

- **Amadeus Data Processing** This group runs the Amadeus central computers and the global network (AMANET). It is located in Erding, just outside Munich in Germany and is home to a special purpose computer building that houses some of the world's largest main-frame computers and a whole host of smaller interlinked machines, e.g. six IBM main-frames, two Amdahl main-frames, four Unisys main-frames with 68 processors and massive amounts of magnetic data storage. The operating system environment is in several parts: an IBM transaction processing facility (TPF) for reservations applications, an IBM virtual machine (VS) and IBM multiple virtual storage (MVS) for software development and support. The standard Unisys operating system OS 1100 is used to run the Fare Quote system. These computers have a maximum capacity of 900 end-user transactions per second, and the current workload of approximately 30 million transactions per day is therefore well within this ceiling.
- **NMCs** There is one Amadeus NMC located in virtually every major country. Each NMC is responsible for the marketing of Amadeus within its own geographical area. This includes functions such as local customer service, helpdesk support for travel agency users and running the national distribution system (NDS) network. Most NMCs own their local NDSs through which subscribers gain access to non-air services including rail, ferries, tour operators, event ticketing and back-office systems.
- **Partner airlines** Many Amadeus partner airlines own a share-holding in their local NMC (through which Amadeus is provided to subscribers). These airlines also use Amadeus for their own internal purposes.

The acquisition of System One from Continental Airlines in April 1995 was a significant move for Amadeus, and it is therefore worthwhile examining this in a little more detail. To be precise, the acquisition made by Amadeus was of all the CRS assets of Continental Airlines' System One subsidiary. As a by-product of this acquisition, Continental obtained a 12.4 per cent stake in Amadeus. Overnight, Amadeus became the largest single GDS in the world.

System One's travel agency customer base and information management software were transferred into a newly formed company called System One Information Management LLC. This new company is owned in equal parts by three stakeholders: Amadeus, Continental Airlines and Electronic Data Systems (EDSs). The resulting entity operates within the Amadeus organization as an NMC. It provides information management, marketing, distribution and customer support functions to travel agencies in the USA, Canada, Mexico, Central America, the Caribbean and markets in the Pacific area.

The System One Information Management LLC is the largest NMC in the Amadeus group with its products used by the top ten USA travel agency chains that themselves service a significant share of America's business travel market. This NMC has been charged by the parent company with the further development of the Amadeus product line, drawing on resources from EDS and Amadeus itself. The objective is to make all new products developed in this way available to all Amadeus subscribers around the world. This development programme has been assigned the name Operation Unison. This specifically includes the constant and gradual enhancement of System One functionality, culminating in the transition of all System One Information Management subscribers to the Amadeus Central System in the Erding data centre. In fact the first stages of this transition have already been completed with the linking of the two computer centres and the introduction of new functionality that enables subscribers to share bookings across both computers. The end-date for the complete transition was year-end 1997.

So, Amadeus operates its GDS through the decentralized organization described above. However, in addition to this, it also keeps close contacts with its primary subscribers through the Travel Agency Advisory Board (TAAB). This is a consultative group formed in 1989 with members from travel agencies in several different markets.

The prime objective of TAAB is to assist Amadeus in product planning and development activities.

The underlying IT architecture of Amadeus is subtly different from the other three major GDSs. In almost a kind of reflection of its organizational structure, Amadeus has adopted a more decentralized method of inter-connecting its systems components. At the core is the Amadeus Central System that controls access to the core supplier systems on a global scale, i.e. air, hotel and car rental. Then at the NMC and NDS level, i.e. the local market level, Amadeus provides interfaces to non-air suppliers, such as rail companies, ferry companies, tour operators and events providers. Finally, there is the AmadeusPro software, through which subscribers gain access to Amadeus and use it on a day-to-day basis. Let's take each of these components in turn.

The Amadeus Central System

The Amadeus Central System supports workstation access and host booking functions for global airlines, hotel chains and car rental companies. These central systems applications, which run on the Amadeus main-frames housed within the Erding data centre, fall into two main types: (i) host connectivity applications, and (ii) core end-user support functions. I'll cover each in a little more detail. First, the host connectivity applications for air, hotel and car.

Amadeus Air

The Amadeus Central System supports the flight schedules of more than 740 airlines of which 440 may be booked by subscribers. Of the 440 airlines, 220 participate with Amadeus in Standard Access, 140 in Direct Access, 150 in Amadeus Access and over 230 airlines show last seat availability displays. Incidentally, these individual figures do not add up to 440 because many airlines are connected to Amadeus so as to provide multiple levels of participation, i.e. they are counted more than once. So, it is important to understand the various levels of airline participation that Amadeus provides. The following are the main ones:

- **Amadeus Standard Access** This is the most basic level of participation. Flight schedules are loaded into the Amadeus data base from magnetic tape provided by participating airlines. All information is then shown on Amadeus principal displays, but seat availability and subscriber reservations are made using teletype messages that flow between Amadeus and the host airline's CRS.
- **Amadeus Direct Access** This enables users to be connected to the participating airline's CRS and therefore their seat inventories, on what is known as a secondary carrier specific display. This means that all messages are presented to the user in standard Amadeus format and all information on seats, schedules, fares and flight details is right up-to-date. Seat sales are reported to the participating airline by teletype and once confirmed, are guaranteed.
- **Amadeus Access** This is the highest level of participation and is achieved by means of an on-line real-time link between the Amadeus GDS and the participating airline's CRS. Three functions are supported within Amadeus Access:
  - *Full Amadeus Access* Participants at this level enjoy both the Amadeus Update and Amadeus Sell functions described below.
  - *Amadeus Update* This enables end users to view real-time schedule information including, for instance, flight irregularities and last minute changes, on their principal displays. When the system shows nine seats available, this actually means that at least nine seats are available for sale. When the system shows a number less than nine, then this represents the actual number of seats left on the flight.
  - *Amadeus Sell* With this function, when a user sells one or more seats, the sale is immediately confirmed by the participating airline's CRS. The airline's own record locator is sent to Amadeus and stored in the PNR. This is achieved via a special function invoked by the user, called Record Return.
  - *Record Return* This is a function by which a participating airline's CRS acknowledges the receipt of a sale made in Amadeus by sending its own record locator for display to the user. This may be requested by the end user who makes an RL entry on an Amadeus PNR. Record Return is automatically integrated within Amadeus Sell but is optional for airlines participating in Amadeus Direct Access.

I have mentioned the term Principal Display several times, so it is about time I defined it. First of all, Amadeus's Principal Display confirms to the neutrality rules of the EC Code of Conduct for CRSs (see Chapter 1). This means that all flights shown on a Principal Display are shown in sequence by: (i) direct flights by the departure time closest to that specified by the end-user's availability request entry, and (ii) connections by total elapsed time of journey with shorter times at the top of the list. The Principal Display is the display shown by Amadeus of its participating airline CRSs. Amadeus considers this to be accurate and constantly up-to-date thus obviating the need to view secondary displays that are produced directly from participating airline CRSs themselves. Amadeus Principal Displays may be customized by the end user in several ways. This is an important feature of the GDS, which I will therefore illustrate by way of some frequently used examples as set out below:

- **Neutral schedules** This is the basic display that shows the schedules of flights according to EC ranking guidelines as described above. It includes the schedules of all participating airlines, including those that are full and supports bookings on all participating airlines. Neutral schedules may be modified by users to rank flights by elapsed time, departure time or arrival time. They may also be restricted to the flights, or combination of flights, of up to three airlines.
- **Neutral availability** This type of Principal Display shows only those flights that have seats free for booking purposes. Possible modifications of this type of Principal Display are to show flights by connecting point, connecting time, time of departure or a list of flights up to one week ahead.
- **Dual city pair** This shows flights between the city of origin, i.e. the departure city, and two different destinations on the same screen. Alternatively, the display may show the outward and return flights on the same screen.
- **Carrier preferred** This type of Principal Display is only available for those airlines that participate in Amadeus at the Amadeus Access level. This shows only flights of a chosen carrier or other airlines that the chosen carrier wishes to display. All such flights are ranked by the carrier's chosen preference.
- **Direct access** This is identical to 'carrier preferred', as described above but with the added modification that displays may be ranked by the time of departure. Other modifications to the ranking are supported according to the participating airline's choice.
- **Timetable** Shows a timetable of all airline flights between a given city pair. The display may be ranked by date range or a specific day of the week.

The above Principal Display customization features are very important to a travel agent, or an airline sales office come to that. It enables the end user to tailor the GDS display to meet the needs of his/her own particular business or corporate customer: all this is provided by Amadeus under the umbrella of the EC Code of Conduct, which aims to limit the power of GDS systems to discriminate unfairly between airlines for commercial advantage.

A critical function of any GDS that is closely linked to flight availability is the fares that pertain to those flights. The Amadeus Fare Quote system supports this key function. It is a system based originally on the SITA and Air France fare quote systems. Amadeus Fare Quote now holds over 50 million specified fares and can build a virtually unlimited number of special fare combinations via its dynamic add-on processing capability. It obtains these fares from a number of sources, including SITA, ABC, ATPCO, IATA and approximately 90 airlines that maintain their fares on-line using the Amadeus Fare Quote system.

The Amadeus Fare Quote system can price up to 12 booked flight segments with 11 fare components. It can also support *Fare Driven Availability*, which allows the user to request a display of all flights on a specified itinerary that meet certain fare criteria. The *Best Buy* feature is also very useful in today's price sensitive markets. It automatically finds the lowest possible fare for an existing booking and allows the travel agent to re-book the itinerary using the lower fare. Finally, there is *Informative Pricing*, which allows an itinerary to be priced without having to create a PNR first.

Amadeus Cars

Amadeus has on-line links to most of the world's major car rental companies. This allows subscribers to book car rental services and either include them as part of an existing air PNR or to provide them as a separate stand-alone service. The computerized inventory control systems of car rental companies may be connected into Amadeus via two alternative methods:

- **Amadeus Standard Access** This method of participation is based on standard teletype messages that flow between the car rental company's computer and the Amadeus Central System computer. This allows booking messages to be sent to the car rental company, which responds by returning confirmations formatted as teletype messages.
- **Amadeus Complete Access** This is based on high speed telecommunications links between the car rental company's computer and the Amadeus Central System computer. When a booking is made, a booking request message is instantly sent from Amadeus to the car rental company's computer. This returns a message containing a confirmation number and other relevant data, within a period of between four and eight seconds.

Car rental displays fall into four main types: Car List, Car Inventory, Car Availability and Car Shopper's Guide. The Car List display shows all car rental offices and their proximity to local airports. Car Inventory shows car companies serving a specific location and displays the availability status of each car type, for each company. Car Availability provides availability and rates for a range of car types, including rate plans, rate categories and mileage charges. Finally, the Car Shopper's Guide is a multi-company display that searches for all car types and/or classes and gives an indication of the best car rental value in ascending order based on the period of rental and the location specified. All displays may be customized by the end users according to their own and their customers' preferences.

Amadeus Hotels

Over 35,000 properties around the world may be booked directly via the Amadeus Hotels facility: and in addition to the standard set of hotel rates available via participating chains, a facility to allow travel agents to store their own specially negotiated hotel rates was introduced in 1995. The Amadeus Hotels function was developed alongside the car rental system previously described. The advantage of this to the user, is that a common approach is used for both products. The levels of participation, for example, are Amadeus Standard Access and Amadeus Complete Access, which are virtually the same as described for car rental above.

Even the hotel display formats are similar in concept. These are Hotel List, Hotel Inventory, Hotel Availability and Hotel Features. Hotel List shows a comprehensive list of hotels for a specified city or country including the location of the hotel in relation to the city centre and the recommended form of transport from the airport to the hotel. Hotel Inventory shows room availability by type of room, over a 48-day period. Hotel Availability, as the name implies, shows the availability and rates for a combination of room types, including property codes, area identifiers, currency codes and hotel feature indicators. Hotel Features gives detailed information on the features and facilities offered at each property as well as booking policies and negotiated rate booking procedures. As for car rental, each display may be customized by the end-user according to their mix of business and the needs of their corporate customers.

Core functions

The core functions that support the Amadeus GDS are grouped under the banner Amadeus Service. These functions are generic and support nearly all the major activities of end users. They fall into two main groups: (a) functions that improve the productivity of end users by automating repetitive tasks, and (b) information that is commonly needed to service customers of travel agencies and the sales offices of partner airlines. Here are just a few of the main ones:

- **Central profiles** This enables travel agents to store personal information about their business travel companies and frequent travellers. Examples of this kind of information are company name and address, department codes, travel policy, traveller dietary needs, individual seating

preferences, home address and contact telephone numbers. All of this information may be referenced during the booking process and certain fields may be automatically copied into the PNR. In fact a PNR can be created automatically from a Central Profile *and* a Central Profile can be automatically created from a PNR.

- **Card check and ticket check** This is a function that supports sales made by customers using credit and charge cards. It automatically verifies credit card sales by sending authorization messages to the computers of major card companies. The checks also extend to lost, stolen or blacklisted airline tickets.
- **Ticketing** Amadeus supports all three ticketing methods used around the world. These are: (i) the conventional transitional automated ticket (TAT), (ii) the ATB, and (iii) the new ATB2 (see Chapter 3 for a more detailed discussion of ticketing methods). The support provided by Amadeus for these different ticket types varies with the deployment of each type, on a market-by-market basis.
- **Amadeus' information system (AIS)** This provides users with access to on-line information on Amadeus products and participating suppliers. An up-front news page gives highlights of new additions.
- **Amadeus' instant marketing (AIM)** This is an important feature that suppliers can use to market their products and services to travel agents around the world. It allows suppliers to target promotional and information messages to subscribers via AIS pages, sign-on messages, broadcast messages and display messages (see the special section later in this Chapter).
- **Calculator** A self-explanatory feature but one that has been enhanced also to provide currency conversion functions and encoding/decoding of city, airport and provider codes.
- **TIMATIC** On-line access to passport, visa and health information for all countries.
- **On-line help** An information source that helps subscribers solve problems related to their use of the Amadeus system. This is probably the first step that a user would take in attempting to resolve a problem. If this was unsuccessful, the local Amadeus help desk would need to be contacted by telephone.
- **Practise training** This simulates live use of the system but does not create any live bookings and does not allow any entries to affect the live Amadeus system. It is extremely useful for first time users who wish to try out their recently acquired knowledge of Amadeus without affecting live work.
- **Scholar/teach** This is a self-learning facility that subscribers can use at their own pace to gain a solid grounding in how to use Amadeus. However, it is nevertheless secondary to attending a purpose-designed classroom training course specifically designed to teach people how to use Amadeus.

Finally, one of the most important functions in any GDS is the way in which PNRs are processed. The Amadeus PNR contains all the information related to a customer's travel plans. A travel agency may create and access its own PNRs and it may optionally grant access to its PNRs, to other affiliated agencies, which may be located in other countries. In addition to this, a travel agent may also authorize any one of 102 participating airlines to access and change a traveller's PNR. This can be a valuable customer servicing feature once the traveller has departed on their journey.

The 24 information fields that comprise an Amadeus PNR may be created by the end user in any convenient sequence, at the same time. Amadeus automatically places all such entries into logical or alphabetic sequence. PNRs may be modified by reference to the line number that contains the data to be changed. Flight classes and dates may be re-booked in a single transaction, thus saving time and maximizing an end user's productivity. All such changes are recorded in a PNR history file, which can be very useful when a dispute arises between a customer and their travel agent. Amadeus PNRs may be retrieved by record locator, name of traveller, flight number, frequent flyer number and a variety of other key fields.

Amadeus also provides special PNR features for groups of travellers. Groups, in this context, are more than ten passengers who all share the same itinerary. A specialized feature called Non-homogeneous PNR enables groups to be linked, but for their individuals to each have their own PNR entries. With this feature, the group view

may nevertheless, still be displayed upon request. As mentioned above, a PNR can be automatically created from a Central Profile *and* a Central Profile can be automatically created from a PNR. Finally, the Replication facility allows a new PNR to be automatically generated from an existing one using a variety of rules, e.g. copy all segments but exclude elements not associated with the new PNR.

Local travel supplier systems

One of the keys to successfully connecting a number of non-air supplier systems to Amadeus at the local level is the back-bone telecommunications network, which is called AMANET. This is a high speed terrestrial network capable of transmitting 29 million bits per second via 14 data lines, each carrying 2 Mb/s. Incidentally, the word 'terrestrial' as used here, means that AMANET is based on a network of data lines rather than satellite links. The network comprises a total of 14 nodes located at strategic points around the world (in Europe, North America and Asia). In AMANET terms, a node is defined as a group of computers and modules that routes data in the proper direction; and data in this context can be anything from simple text messages to voice and video traffic.

Because Amadeus is totally dependent upon AMANET, Amadeus has taken many steps to protect the integrity and reliability of the network. All high speed main trunk lines, for example, are duplicated; and despite the fact that the core operational network is terrestrial, AMANET uses satellite communications technology to: (a) provide a back-up service in the event that land based lines become unavailable, and (b) transmit data to any point in Asia via its own satellite ground station. The network also has the capability to route messages via alternate paths to avoid areas of congestion or unavailability.

AmadeusPro

AmadeusPro is a PC-based travel agency management system that focuses on providing an easy to use Windows based GUI to the Amadeus Central System. The family of products that falls under the AmadeusPro banner is as follows:

- **AmadeusPro Res** A software product designed for operation on a standard PC running the IBM OS/2 operating system. This provides a mouse and icon based interface to the Amadeus Central System as well as an interface to locally connected suppliers. It also allows users to work with standard OS/2 based integrated office applications, such as spreadsheets and word processors.
- **AmadeusPro Tempo** This is almost identical to AmadeusPro Res but is based on a Microsoft Windows operating system environment. This product does not demand such a high level of PC specification, for the workstation platform.
- **AmadeusPro Base** This is an extended version of AmadeusPro Res that supports locally stored client profiles and other booking reference data. All data stored locally on the PC in this way are used during the booking process in an entirely interactive way.
- **AmadeusPro Sale** This is a mid-office product that provides support for the reservations functions, local client profiles, local storage of other data and integration with office productivity tools (see Chapter 7 for a definition of front-, mid- and back-office agency management systems).

These products all provide the user with three optional ways to use the software. The basic level is called the Guided Mode. It helps the inexperienced user through the booking process using preformatted screen and fill-in boxes. Speed Mode shows more native Amadeus Central System displays and supports special tool bars with colour coded push buttons that are activated by mouse clicks. Amadeus estimates that Speed Mode can reduce input effort by up to 68 per cent and thus help the user achieve significant productivity benefits. Finally, Expert Mode allows the user to work entirely with the native Amadeus Central System.

GALILEO

Galileo (Fig. 4.2) is one of the world's larger GDSs, with 27 per cent of the automated travel agency market. It required an initial investment of £200 million to set it up and was first introduced in 1991. Galileo International is the name of the

Figure 4.2 The Galileo logo

global distribution company that provides two core systems to countries around the world: Apollo in the USA and Galileo throughout the rest of the world. Within each country Galileo has a national distribution company (NDC) that is responsible for selling and supporting the Galileo service locally within that country. There are now 45 NDCs providing coverage across the Americas, Asia Pacific, Europe, Africa and the Middle East. In the UK the NDC is called Galileo UK, which is a part of Travel Automation Services – itself a wholly owned subsidiary of British Airways. But before we look at that, it is worth considering Galileo from a global perspective.

Galileo International

Probably the first major development in Galileo's history was the formation of the United Airlines Apollo system in 1971. In 1986 Apollo's owner was re-branded Covia, which became an independent affiliate of United Airlines. Galileo International was founded in 1987 by British Airways, Swissair, KLM and Covia. Originally, the headquarters were located in Swindon in the UK. More recently it was decided to relocate the headquarters to Chicago in the USA. Other key sites are Denver (where United Airline's Apollo system is based), Miami, Swindon and Hong Kong. In 1992 the European and North American owners of Galileo and Covia combined the two companies to form a major GDS. The combined group now has over 2,000 staff. Galileo International is jointly owned by eleven of the world's major airlines as shown in Fig. 4.3.

Additionally, Galileo International has two associate airlines: Ansett and Australian Airlines. The prime function of Galileo International is to provide the core reservation services for all of the NDCs. It is responsible for the day-to-day operation of the computers, data bases and telecommunications facilities that distribute 500 participating airlines (200 of which are linked directly to Galileo), 37,000 hotel properties and 47 car rental company systems, to NDCs in countries around the world. Between them, these two systems support some 33,000 travel agency locations using 128,000 terminals in 66 countries. The main categories of supplier systems include airlines, hotels, car hire companies, rail operators, ferry companies, sporting

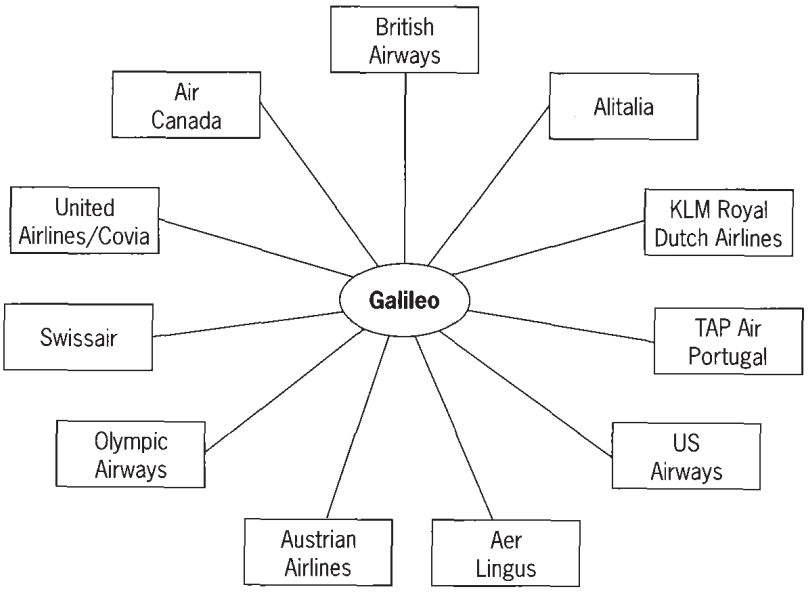

Figure 4.3 Galileo's owners

event promoters, theatre ticket agencies, general travel information providers and much more.

Before we evaluate the end-user aspects of Galileo, it is important to understand the core system. The core system used by areas of the world outside the USA is called the Galileo Central System (GCS). In fact, even USA users are gradually being migrated to this common core system.

GCS technology

The Galileo GDS is a global computer and telecommunications system that uses a central worldwide data base and high speed links to many airline CRSs. Users of Galileo interact with the system via a special airline oriented language that resembles a kind of special 'computer like' code. However, GUIs which run in Galileo's PC-based delivery systems are increasingly making this coded language easier to use for travel agents. This allows the central system to carry on using the highly efficient message format so ideal for computers but so disliked by human beings. Even with these coded message formats a considerable amount of processing power is needed just to run the network.

The central Apollo and Galileo systems are run on 15 IBM and Amdahl main-frame computers and other processors, all of which are housed in a large computer complex in Denver with a combined floor space of 21,924 m^2 (equivalent to 46 full-sized tennis courts). These computers have a processing power of 3,283 MIPS (million instructions per second) and handle over 66 million messages each day. The operating system environment is based on IBM architectures and uses a transaction processing facility (TPF), a virtual machine (VM) and a multiple virtual storage (MVS).

All computers on the global network are connected by a wide area network based on IBM's SNA protocol. Galileo distributes its systems around the world using a variety of telecommunications technologies. The company's sites in Denver and Swindon use a 'meshed' back-bone network to provide direct connections between participating supplier systems and travel agents. The term 'meshed' network means a system of leased high speed communication lines that are routed via alternative points. When viewed as a diagram, this appears to connect each location in a multitude of point-to-point lines that resemble a mesh. Network architectures such as this provide a high degree of resilience in the event of failure of a single line or node point.

In addition to the meshed back-bone network, Galileo makes extensive use of independent international network service providers to increase its reach into the global market. Where it is justified, Galileo has incorporated network hubs from strategic network providers into the high speed switching and routing systems in order to provide a fault tolerant front-end to the reservations systems. This reduces response times, i.e. makes the system faster, increases reliability and improves the quality of the managed service afforded to the customer.

So, the Galileo Central System is distributed around the world using a kind of super-highway. But at the local level in each country, Galileo changes onto 'B' roads that are more suitable to local market conditions. It is for these reasons that the NDCs in each major market use their own communications networks to distribute Galileo on a local basis. The UK NDC, for example, uses an X25 communications network with widely dispersed local nodes. The European gateway for this local X25 hub is located in Swindon in the UK.

Finally, because Galileo's operations are dispersed widely around the world, it is critical to the efficient running of the company that a fast and reliable internal communications network is available. The Galileo corporate back-bone network provides such a function. It supports LAN and WAN technologies between major sites, such as Swindon, Denver and Chicago. This internal network supports voice, data and video traffic.

Travel Automation Services (TAS)

British Airways owns a subsidiary in the UK called Travel Automation Services (TAS). This company started 'life' way back in 1977 as Travicom (see Chapter 3 – for the history of airline reservation systems). In 1997 TAS was re-structured to form three separate business units: Galileo UK, Chameleon and Icanos. Each of these companies focuses on a specific area of the travel automation market:

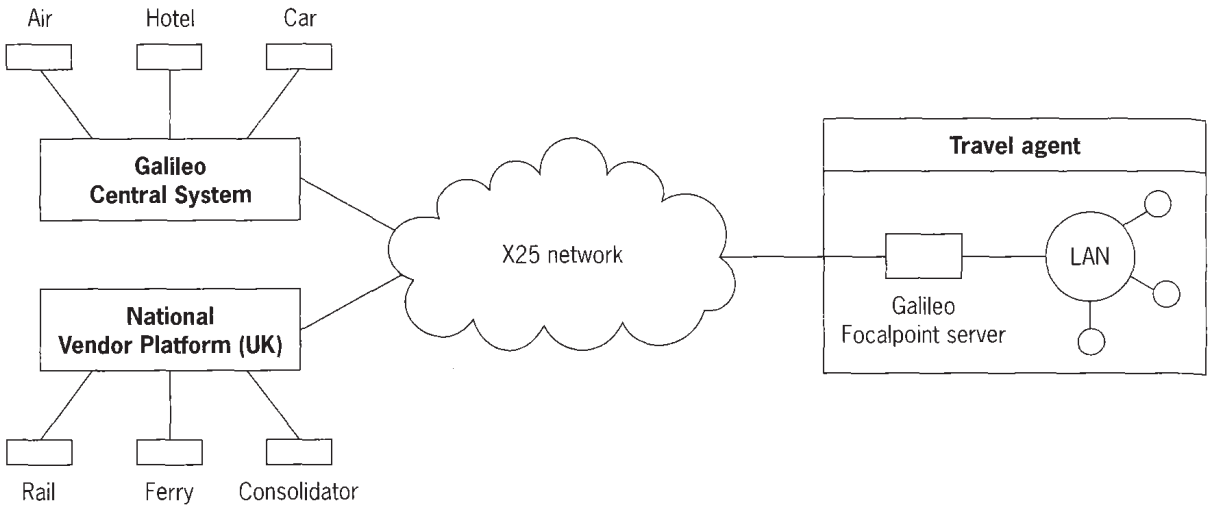

Figure 4.4 The Galileo GDS

- **Galileo UK** Galileo UK is the NDC that distributes Galileo International within the UK area. The Galileo system was first introduced to the UK in 1991 and from July of that year travel agents were gradually converted over from the old Travicom system to the new Galileo core. Galileo UK, as a business unit within TAS, is a wholly owned subsidiary of British Airways and has its headquarters in Maidenhead. Galileo UK currently has over 14,000 workstations installed (most of which are now PCs), in around 2,000 travel agents in the UK. This represents 68 per cent of the UK market.
- **Chameleon** This business focuses on training and consultancy. The Chameleon business was formed from the merger of both Speedwing and Galileo UK Training. Its primary role is to run courses for travel agents in how to use Galileo, its sister products and other GDSs.
- **Icanos** In its broadest sense, Icanos provides IT solutions to the travel industry. It will provide network services for individual customers, supply rail and ferry booking systems, market agency management systems and provide its customers with an IT development resource and centre of technical expertise.

Because this section of the book focuses on GDSs, it is the Galileo UK business that I am going to concentrate on here. I have tried to keep the description of Galileo's products as generic as possible and not solely restricted this analysis to a description of what is available only in the UK. However, some UK bias does nevertheless remain. The UK National Vendor Platform (NVP) is one such example, although it is probably mirrored in other NDCs around the world.

The UK NVP

The UK NVP is the technology that Galileo UK uses to connect its subscribers to non-air supplier systems. Galileo's general approach is a distributed one and uses X25 packet switching as its core communications methodology (Fig. 4.4). This enables Galileo users to link into non-core supplier systems, i.e. those that exclude air, hotel and car hire, without affecting the host switching systems of Galileo International. Examples of NVP host systems include train operators, ferry companies and air seat consolidators. Travel agents may book inventory on behalf of their customers from all NVP supplier systems although these entries are not at present integrated with Galileo's booking file (see later paragraph for a more in-depth presentation of booking files).

The Galileo NVP uses Sun Sparc Station technology to provide an X25 switching service to non-core supplier systems. Travel agents request a connection to their desired supplier system by entering a three character code on their Focalpoint terminal, e.g. RLY for rail, GAL for Galileo, PAO for P&O Ferries, STE for Stena Lines and GBT for

Guild Air Fares. This entry causes the Focalpoint LAN server or other Galileo terminal equipment to set up a communications session or path with the chosen host system via the NVP. Such a path supports all of the functions that the supplier's host system chooses to make available to travel agents via the Galileo route.

A particularly powerful feature of Galileo's UK NVP, and one that holds significant future potential, is the rail link. At present, when a user selects RLY on their Focalpoint PC or other Galileo equipment, they are connected to Eurostar's tribute sales guide (TSG) system. This system controls the inventory of Eurostar cross channel tunnel train seats. The Eurostar reservation system is located in a computer centre in Lille, France, and supports several important functions: such as the provision of timetable information, reservations on certain trains and ATB2 ticketing for Eurostar trains.

However, its true potential is illustrated by the fact that the Eurostar computer facility is co-hosted with France's SNCF computer, i.e. the computer of the French national railways; and this computer facility is linked back to the TSG system and the UK's ATOC computer in Nottingham, UK. There are also plans to provide an NVP machine interface record (NVMIR) that could be used to feed back-office systems connected to Galileo. It is therefore possible that given the right authorities and technical interfaces, Galileo users can be provided with reservations access and ATB2 ticketing functions for at least three of Europe's main rail services within the not too distant future.

Galileo's delivery products

A delivery product is a terminal that connects the user to the GCS. These days most delivery products are PCs that run special GUI-based applications within a standard PC operating system such as Microsoft Windows 95. This enables users to have reservations functions that coexist with standard office productivity tools such as word-processors and spreadsheets. The Galileo delivery products are:

- **Focalpoint** This is Galileo's main GDS access product and provides the primary interface to the GCS. In the past the hardware platform was Olivetti PCs with an in-built LAN capability. In future these will be replaced by Trigem PCs. The Galileo file server supports central storing of agency data, word processing, more sophisticated use of the PC's function keys, scripting and the connection of up to 24 workstations.
- **ET3000** This is the basic DOS-based Galileo airline reservations service for a small to medium sized travel agency, i.e. ET3000 is not Windows based. The ET3000 workstation (or travel agent terminal) is an Olivetti PC that is capable of running many of the packages available on the software market, such as word-processors, spreadsheets and data bases. The reservations services are described in more detail in the following section. ET3000 will gradually be replaced by Focalpoint products over the next few years.
- **Leisurelink** This provides a link to viewdata networks from a Galileo PC. It is designed for those travel agents who are principally in the air sales business but who need occasional access to tour operators and other principals that distribute their products via viewdata. The viewdata emulation is provided by the Travipad for ET sites and by the Galileo workstation file server (GWFS), for Focalpoint sites.

Besides these delivery system products, there are several agency management systems that are marketed principally in the UK by TAS's Icanos business unit (see above for a description of Icanos). One of these is Travel Manager and another is Travel Edge. Both are newer technologies that will no doubt gradually replace the President Agency Management System (PAMS). PAMS is Galileo's basic back-office system product that has by now been around for many years. All of these systems provide travel agency accounting and management information functions that are described in more detail in Agency Management Systems, Chapter 7.

Galileo's delivery systems technology

The above delivery system products describe what the user interacts with, in terms of functions and access methods. However, a great deal of co-operative processing now takes place on the end-user's workstation. Co-operative processing in this context means the sharing of processing between the GCS and the delivery system. The delivery

systems are now capable of performing some significant functions, in addition to just being GUIs to the GCS. It is therefore worthwhile spending a short time reviewing the technological platforms upon which these products are based.

- **The workstation** The latest Galileo workstations are based on Trigem PCs. For the Focalpoint product there are two models of PC, one for the central file server (GWFS) and the other for the workstation. The central file server is of course a key component of the Focalpoint product. This is a powerful Trigem 3560 PC known as the GWFS. It is a Pentium P100 processor with 32 Mb RAM, a 1.2 Gb hard disk, a 1.44 Mb 3.5″ floppy, a VGA colour monitor and Ethernet interfaces. Each of the workstations is a Trigem P100 with 16 Mb RAM a 1.2 Gb hard disk, a 1.44 Mb 3.5″ floppy, a VGA colour monitor and Ethernet interfaces. Travel agents can use their own PCs with Galileo Focalpoint Special Edition (but not with ET products). In such cases, Galileo stipulates that the minimum PC requirement is a 486/66 MHz with 16 Mb RAM.

  The GCS can support up to five sessions at any one time, i.e. five work areas per agent sign-on. This is rather like having five separate terminals on your desk, with each one carrying on its own dialogue with the GCS. But using a Galileo PC, you don't need all five terminals because the combination of the GCS and the Windows operating system under which Galileo runs, supports several activities at once. This can be useful for carrying on a reservation for client A while also checking availability for client B. It is also possible to use this facility to construct several alternative itineraries for a client and to offer the client the option of which one to actually book. Galileo supports up to nine windows for displaying information simultaneously.
- **The Travipad** In order to work effectively the Galileo workstations must be connected to the Galileo core system via a communications controller called a 'Travipad'. This supports up to 48 workstations and handles all telecommunications tasks using X25 telecommunications technology. The Travipad is a black box as far as the travel agent is concerned and is virtually never used except when something drastic goes wrong. In such cases the Travipad may be used to test the status of the data line connecting the travel agent to the Galileo communications node. In terms of physical location the Travipad therefore needs to be positioned as close as possible to the data line terminating point in the office.
- **The printers** There are several different types of printers used as part of the Galileo system. These comprise the ticket printer, the invoice/itinerary printer and a general purpose printer. It must, however, be noted that if back-office accounting functions are required, an agency management system will be needed by the travel agency (see Chapter 7). Also, if word processing is required then not only will a general purpose printer be needed but a word processing software package that runs on the Galileo PC must also be installed.
  - The ticket printer may be either: (a) a dot matrix printer that is capable of using the OPTAT airline ticket stock available on continuous stationery from IATA, or (b) an ATB printer with several hoppers capable of supporting different ticket types. In some cases, this printer can also be used to print customer itineraries and invoices. In so far as dot matrix printers are concerned, to save continually changing the paper stock loaded in this printer it will usually be necessary to have at least two ticket printers of this type; one loaded with continuous airline ticket stock and the other loaded with pre-printed paper stock bearing the travel agent's logo, which can be used for invoices and itineraries.
  - The hard copy printer is usually an inexpensive and low quality device used to produce a printed copy of a Galileo screen for archive purposes. It may also be used to print queue messages. Generally speaking, although a hard copy printer is a necessity in a travel agency, its regular use is to be discouraged. This is because paper clutters up the office and the booking files. The travel agent user, once fully confident with the reliability of the Galileo system, will find little need to

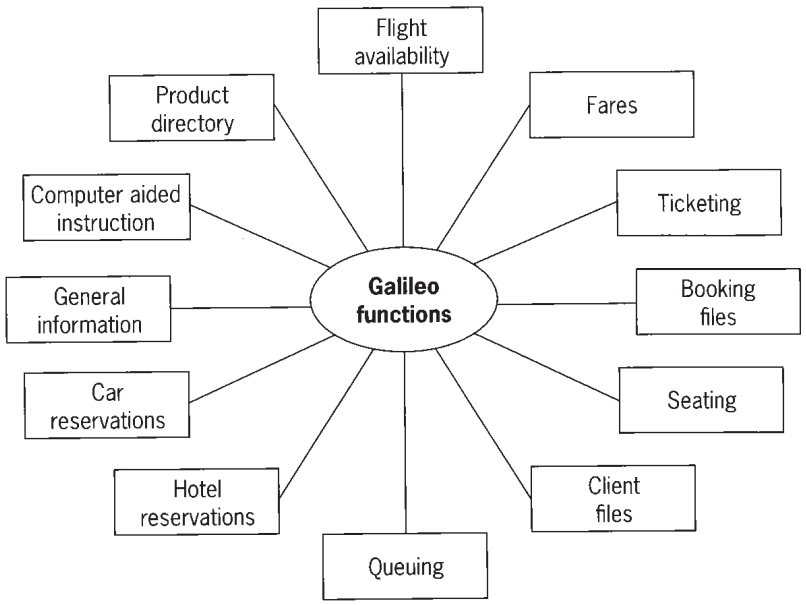

Figure 4.5 Galileo functions

print everything and will gradually regard a client file as an electronic image only.

- The general purpose printer may be either a dot matrix or a laser. A dot matrix is cheaper but the quality of the typeface is not considered particularly professional these days and it has the added disadvantage that it is noisy. The laser printer is expensive but produces an extremely high quality output and is virtually silent in operation. Both options are available from Galileo.

- **The software** The Galileo software is the critical ingredient that makes everything work. It exists in two places: (a) in the main-frame that runs the Galileo core system; and (b) in the Galileo workstation, which is a powerful PC. It is the workstation software that is of prime interest to the travel agent. The underlying operating system used to control this workstation is Microsoft Windows.

  Besides using the Galileo workstation for the core business, the travel agent may elect to use the PC for other purposes when it is not being used for reservations. In order to do this the PC will need to have some additional software loaded. This software can be stored on the PC's hard disk until it is needed. Software such as spreadsheets, word processors and data base management systems can all be used.

Galileo's core functions

There are many functions provided by Galileo and it would be impossible to cover them all in detail in a book such as this. The only way of learning more about Galileo and of becoming proficient in using the system, is to attend one of the training courses run by Chameleon. The intention here is therefore to give you an overview of the main functions and to help you understand the structure of the system. The functions that Galileo provides and which I am going to describe in this section are as shown in Fig. 4.5.

Flight availability

This is one of the most frequently used functions in the Galileo system and represents the first step in making a booking. Before looking at an availability display, the agent will normally have discussed the customer's travel requirements and established the basic routing of the journey. As an integral part of doing this, the agent will usually access the timetable display within Galileo.

- **Timetable** This shows the connecting flights between any two airport cities in the world, for 28 days from the specified date of travel. This is far more efficient than using other paper-based sources and reference books. It shows the days of operation of each flight and the dates that

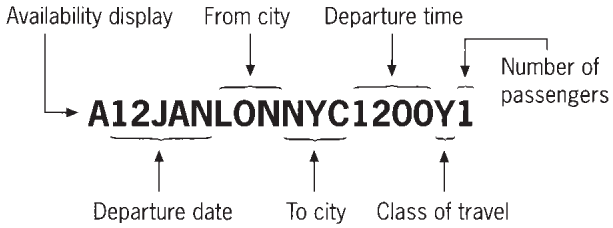

Figure 4.6 Galileo availability display

services start and finish. A range of qualifiers, such as specific times or actual airports, may be requested and particular carriers can be either included or excluded from the display.

- **Flight specific timetable** This is a more targeted and detailed display of flights that is constructed from the data base of Galileo's participating airlines. It shows total flying time, time spent on the ground, the classes of travel available, the terminal numbers and any stopovers involved. Other relevant information is also shown, such as non-smoking flights and code-share flight data.

Once the basic itinerary has been ascertained from the timetable function, the agent then enters the first sector of the itinerary as demanded by the customer's travel plans. This will usually comprise the departure date, a city pair between which travel is required, a preferred departure time, the class of travel and the number of seats required. An example of a Galileo availability display between London and New York on 12 January, leaving around 12.0 noon for one passenger in economy class is shown in Fig. 4.6.

The system will then respond with an unbiased display of the flight details that most closely match the customer's requirements, for up to seven days ahead. Up to 26 classes can be shown on the display and specific connection points and carriers may be included or excluded as required by the agent. The sequence in which flights are shown on the availability display is as follows:

1. The non-stop flights of participating airlines are shown in a sequence determined by how close the available flight's departure time is to the customer's preferred time of leaving.
2. Then, the flights that stop during the flight are shown. This may be for refuelling purposes or to pick up other passengers from connecting flights along the way. In any event the passenger does not have to change flights and often does not have to leave his/her seat.
3. Finally, the flights that require the passenger to change aeroplanes are shown.

The agent may try various alternative displays until one is found that meets the customer's requirements. This whole process is repeated for each sector of the client's itinerary including the return leg. These availability displays allow the agent to build a proposed itinerary for the customer. The most basic display is known as a free-sale display and it can be used to sell seats from all of the airlines participating in Galileo. An acknowledgement of a free sale booking can sometimes take several hours to be received. So, if the agent wants to be sure that those seats are actually reserved for the customer then an on-line seat availability display is necessary. To do this, the agent enters a special code to request Galileo to send messages to the other airlines involved in the itinerary to request an up-to-the-second status of the seats requested. Each airline responds to Galileo, which displays the status codes on the availability screen. There are currently about 211 airlines in Galileo that respond on-line to availability requests like this. The various availability options are as follows:

- **Instant availability** The Galileo system dynamically constructs connections for any requested journeys that are not already stored in the system as city pairs. This means that for a given city pair, Galileo will first attempt to show the direct flights available. Then, if no direct flight is stored, it will find the best set of flight segments involving other cities, i.e. airports, that most effectively join the requested from and to cities specified.
- **Inside availability** Galileo retrieves the availability status from an airline's own system and integrates it into the Galileo availability display. This is done automatically by the system without the need for the user to make any further entries.
- **Carrier specific display** Users of Galileo can request an availability display direct from a preferred airline's own system. This provides a real-time direct link into an airline's own

database, which provides the very latest information available.

- **Last seat availability** Called numeric availability in Galileo, this display shows the exact number of seats left for sale on a particular flight, up to the quota sale level of the airline involved.

At this stage of the booking, the travel agent will have viewed the alternative flight options and discussed them with the customer. The next stage is to confirm the actual flights required by making a firm booking.

Booking files

A firm booking means that a file must be created within the Galileo core system so that the booking can be referenced in the future. The Galileo booking file is an integrated collection of all reservations made for a customer, whether it be for a number of different airlines, hotels, car rental companies or other special services. All such information about the booking is held in this booking file. So, the first step is to sell the seats desired by the customer. Invariably, these seats will be displayed on the screen as a result of the availability request described above. Seats may be sold directly, i.e. a feature known as Direct Booking, or from an availability display, in a number of different ways:

- **Secured sell (interactive)** This is the highest level of booking available in Galileo. The booking request is sent directly to the airline's own reservation system via a direct link and a seat is immediately reserved in the airline's own data base. At the end of the transaction the agent receives a positive acknowledgement record locator direct from the airline's system that is automatically stored in the customer's Galileo booking file. This guarantees that the seat is held for the customer.
- **Super guaranteed sell (positive acknowledgement)** The booking is processed through Galileo's constantly updated data base. At the end of the transaction Galileo instantly sends the airline a booking request message that causes a prompt response to be initiated and returned to Galileo for storing in the customer's booking file.
- **Guaranteed sell** At end transaction, a message is sent directly to the airline on whose flight a seat is required and a guarantee indicator is displayed in the booking file. Every flight booked from a numeric display in Galileo is guaranteed by the airline.
- **Standard sell** At end transaction, Galileo sends the sell request to the chosen airline, which promptly processes the booking. This method is available for each of Galileo's 500 participating airlines.

In order to create a complete booking file, several critical fields must be entered. One good way to remember which fields must be entered is to think of the word PRINT. After all, sooner or later a ticket will be required and this will need to be PRINTed. Each letter of the word PRINT can be associated with one of the key fields required for a booking file to be created that will eventually enable a ticket to be printed successfully. These are:

- Phone field, i.e. the telephone number of the travel agent.
- Received from, i.e. the identity of the agency making the booking.
- Itinerary, which is the end result of the availability and reservation process.
- Name of the passenger(s), an important entry that is difficult to change once entered.
- Ticketing information, i.e. information required to print the ticket and any other supplementary information.

All of the PRINT fields must be entered in order to complete a booking. Having completed the booking entries in this way, the final step is to 'end transaction'. When this is done, Galileo responds with a booking locator that is supplemented by the initials of the agent making the booking. At this stage the booking has actually been made and is stored in the Galileo central system. Additionally, each of the other airlines providing sectors for the itinerary has also stored a record of the booking for their sector only, within their own CRS system.

To retrieve a booking all that is needed is the booking locator. It doesn't matter whether or not British Airways or any of the other Galileo partner airlines are included in the itinerary or not, the locator will always enable the Galileo core system

to retrieve the booking. Should the booking locator be lost or unavailable for some reason, it is possible for Galileo to be requested to display all passenger bookings with a specific surname. The appropriate one may then be selected from the list and the booking retrieved. For those airlines not supporting a locator, the agent must know the PNR and the host CRS before the booking can be retrieved.

Finally, there are the special services that customers often require as part of their trips. Examples include wheelchair requests and tickets that are to be collected at the airport terminal on departure. Each airline system requires slightly different commands to be entered in order to request these special services. Galileo provides a purpose-built function called enhanced booking file servicing (EBFS) that eliminates most of the complexities involved in this task. Galileo provides users with a standard command entry for special requests, which is the only one that a travel agent need learn. Galileo automatically translates this into the individual formats required by each airline system. All such details are stored in the customer's booking file.

Fares

Galileo can construct over two billion fares from its data base, which can be accessed by travel agency users. These fares are set by the world's airlines who keep each other updated on a regular and frequent basis. In fact Galileo's global fares data base is updated three times each day. This is a complex and fast changing aspect of the airline business, especially when you consider that there are, for example, over 30 different fares in force on the average transatlantic jumbo flight.

A fare quote is the automated construction of an airline fare for a booking that has been made. The fare quoted is guaranteed, provided that the agent produces an automated ticket within a period of seven days and has adhered to the rules associated with the fare. A useful facility is the ability to display all fares on a particular route for a specific date. This display shows the cheapest first, then the next cheapest and so on, up to the most expensive. Another useful facility is the ability to display a fare in local currency, i.e. pounds sterling. Because not all airlines quote their fares in pounds on their displays, this can be of great help to the travel agent. The exchange rate used is also displayed.

Ticketing

Galileo supports the production of airline tickets via two broad approaches: (i) by means of a set of ticketing control and printing functions, which are integrated within the GCS; and (ii) by passing an MIR to a separate back-office system, e.g. PAMS, Travel Edge, etc. It is the former method that is presented here. Ticket production via back-office systems is covered in more detail in Chapter 7 (although the related Galileo MIR is explained later in this section).

The GCS produces tickets by combining information from various sources, which are primarily: the availability data base, the booking file, the data base of filed fares and the agency accounting table (AAT). Other ticket modifier parameters may be specified by the travel agent, such as specific carrier selection, form of payment, commission percentage and endorsement data. All of this information is consolidated and used by Galileo's ticket control program to produce the following types of airline ticket:

- **OPTAT and TAT tickets** Galileo supports the printing of airline tickets on continuous paper stock supplied by the local BSP. These may be OPTAT or TAT. Approved ticket printers include the Datasouth A3300, the Texas Instruments TI810 and the MT5200, which is also a multi-purpose printer.
- **ATB** Galileo's ATB ticketing system has been gradually rolled out within the UK since early 1994 (see Chapter 3 for a fuller description of ATB ticketing in general). This ticketing system is supported by a number of models of special purpose ticket printers including those manufactured by IER, Texas Instruments, the MT5200 and Unimark Mark1. These printers produce the required ATB copies, i.e. for flight coupons, audit coupons, agent coupons, credit card coupons and the passenger receipt, by printing each one individually. It does not take much longer to print these copies than it does to print one of the older style OPTAT tickets, i.e. 10–11 seconds. There is also the added advantage that each copy of an ATB ticket may

be printed at a different location. This supports satellite ticket printing in large corporate locations without the need to have trained staff on site to process the ticket copies as is the case with OPTAT.

- **Electronic ticketing** This method does not of course result in a printed ticket at all (see Chapter 3 for a more in-depth description of electronic ticketing). It can only be used in countries where the BSP has granted the necessary authority. Electronic ticketing is designated by the presence of an 'E' in the 'Sell Response' field, which is a part of the booking file. When a ticketing instruction is issued, the validating carrier's system authorizes the request and flags the booking file. As a by-product of this process, a facsimile of the ticket is stored in the validating carrier's ticket data base.

Galileo checks to ensure that all required data are present in the booking file and that the information is correct. If credit card details have been entered as the payment method, then Galileo first carries out a card authorization check. This check is performed via Galileo's link to SITA, which itself has connections to the credit card companies' computer systems. Once authorized, the ticket is then produced by one of the above methods. From this point onwards, the ticket information is available via the ticket invoice numbering (TIN) report. This report shows details of all tickets that have been issued or voided over the past 30 days. It is a valuable report for a travel agent because it allows a reconciliation to be made with the BSP billing analysis.

Seating

Galileo's advanced seat reservation function can display information on the computer screen that represents a seating plan of the flight being considered. This plan is known as a seat map. Seat maps show the actual position of every seat on the aircraft and whether it is near a window or an aisle. The seat map also denotes seats that are either smoking or non-smoking. Several different types of seat map displays are supported by Galileo:

- **General seat map** This function enables a seat map to be displayed for a particular flight, class and segment. The display shows all of the important features within an aircraft, such as toilets, emergency exits, aisles and galleys.
- **Seat availability map** This display shows a seat map that includes only the available seats for a specified flight, class, date and segment. This can show the whole cabin or, by entering preferred seat characteristics or row number, it can show only those seats that match the customer's personal criteria.
- **Specific seat characteristic display** This allows the agent to determine the exact characteristics of a specified seat number in plain text. The seat to be shown is selected from a previously displayed general seat map or seat availability map.

A seat can be reserved in one of two ways: either (a) a specific seat can be requested for the customer by entering the seat number, or seat map co-ordinates, into the system; or (b) a seat type can be requested, such as aisle non-smoking. Once the entry is made, Galileo responds with a confirmation of the seat reserved or a message to indicate that the seat requested is unavailable.

Client files

This is a powerful customer servicing capability that is especially useful for business travel, where travel agents service a large number of frequent travellers. A client file stores information about a client that can be called up instantly on the screen and inserted into a booking file whenever necessary. So it not only enables a travel agent to give a more personal service by knowing customers individually, but it saves a lot of time and keying effort. There are three parts to a client file:

- **The agency file** This is the top level record, which contains details about the travel agency making the reservation. It is a part of the profile that does not often change.
- **The business file** This is the corporate profile, which contains information on a company for which the travel agent provides a business travel service. It might include, for example, some information on the company's travel policy, the departments involved and the account settlement details. In cases where an individual is a frequent traveller but does not work for a

company, this profile is used to store information about that individual.

- **The personal file** This record contains information about each of the individual travellers who work for the company as defined within the corporate profile. It contains information such as the traveller's name, phone number, address, department and personal preferences, e.g. smoker or non-smoker, window or aisle seat, etc.

In addition to these structured profiles there is another very useful function provided by Galileo called the frequently flown itinerary feature. This is designed for frequent travellers who often have the same or very similar itinerary details. A record of these can be set up in skeleton form and can then be copied into a booking file with only the date and number of seats needing to be added to make the booking complete. This is particularly useful to a travel agent for servicing employees of a company with say a head office in Paris where a lot of the itineraries will be virtually identical, i.e. flight London/Paris, standard business class, company corporate hotel, etc.

Queuing

The queuing facility is a powerful tool for controlling work flows and increasing productivity. Queuing is all about the passing of messages: (a) between travel agency staff within the office; (b) between offices using Galileo; and (c) with airlines, hotels and car rental companies. Not all bookings run like clockwork! There are usually complications of one sort or another that require communication between the various parties involved. For example, the airline changes the departure time of a flight after a booking has been made for a client. Or the hotel can only supply a room at the back of the hotel without the sea view requested. Or the travel agent in office A has made a reservation for a client that needs follow-up by an agent in office B. In these cases the airline, hotel, car rental company or agent from office A would send a message to the travel agent informing them of the changes to the client's itinerary details.

The message is placed in a special area of the system that is available for travel agent control purposes, known as a 'Q'. This special area is known as the Queue. It is called a queue because there may be several messages for an agent and these messages are stacked up in the order in which they were sent, for the agent to read and process in sequence. The queue area is divided up into separate sections and each of these is identifiable as a different type of queue. There is usually a general queue area for the agency, a ticketing queue and a queue for each travel agency staff involved in the servicing of customers. You should note that the onus is on the agent to read the queues regularly. If the queues are not accessed and processed in a timely manner then vital itinerary information may be missed with dire consequences for the traveller.

Hotel reservations

Galileo provides its users with the ability to reserve a hotel room for their clients at over 37,000 hotel properties from over 200 hotel chains worldwide. The service is called 'RoomMaster' and it is used by a simple process of filling in an electronic form that is displayed on the Galileo screen. The ways in which hotels are connected to Galileo are very similar to the different ways in which airlines are connected. Some are connected indirectly and provide free-sale room reservations. Others are on-line and provide instant confirmations.

Indirectly connected hotels have a computer system, but it is one that is not capable of being connected directly to the Galileo computer and cannot therefore undertake a two way dialogue with the booking agent. This means that when a reservation is made, it is on a free-sale basis. In these cases the reservation message is passed by a communications network to the hotel's computer, which puts it in a kind of queue for subsequent processing. While this is happening the travel agent will note the reservations request and proceed with other business. At some future time the hotel will process the reservation request and send a message back to the travel agent either confirming that the booking has been made successfully or advising that the room requested is not available.

Directly connected hotels (of which there are 45 in Galileo at the time of writing), have a computer that is on-line to Galileo and can hold an intelligent two-way dialogue with the travel agent making the booking. Galileo often refers to these hotels as having 'inside links'. In these cases when

Table 4.2 Galileo RoomMaster entries

Entry	Meaning
HOA	Standard hotel availability display for a specific city, airport or reference point
HOC	Complete hotel availability, which displays additional room rates and/or room types for one property
HOI	Hotel index, which displays a list of properties for a specific city, airport or reference point
HOU	Hotel update for previous availability or index request
HOR	Hotel reference point list, which displays reference point list associated with a metropolitan area
HOD	Hotel description which displays a keyword menu to access chain or property policies/information
HOM	Hotel modification: modifies or deletes fields in a booked hotel segment

the booking screen is completed it is sent to the hotel computer, which immediately responds with either a confirmation or a 'not available' message. This allows the travel agent to advise the client of a confirmed booking while they are on the phone and saves the agent from having to call the client back as is the case with an indirectly connected hotel.

RoomMaster offers a wide range of functionality for travel agents who wish to book hotel rooms for their customers. The main entries that are outlined in Table 4.2 will, I hope, give you some idea of the range of functions available.

The Galileo Spectrum product (Fig. 4.7) runs within Focalpoint and is fully integrated with Room-Master. It is a CD-ROM-based hotel mapping system covering over 30,000 hotel properties (1,400 of which are mapped) and hundreds of world-wide, regional, metropolitan and city maps that enable users to zoom in and pin-point a hotel's precise location. The maps show places of interest, convention centres and other reference points and may be printed for passing on to customers as part of their travel documentation. Spectrum also allows users to customize the maps to show offices they intend to visit, the hotels where they will be staying and the nearest affiliated travel agency. Distances can also be calculated by Spectrum. So, if a customer has to walk from his/her hotel to a convention centre across town, Spectrum can calculate the exact walking distance.

Spectrum also contains a great deal of detailed information about each hotel, the facilities offered and the rates. Each participating hotel has six displays on which to show details such as amenities, sports and recreation facilities, dining and entertainment, and business services. These details can be annotated with additional details entered by the travel agent. To ensure that the information is kept constantly up-to-date, an updated CD-ROM is sent to the travel agency user every three months.

Once a travel agent has viewed the information on Spectrum with a customer, the RoomMaster function within Galileo is then used to look at the chosen hotel's availability and room rate. Finally, RoomMaster is used to make a firm booking for the customer. Spectrum is a Windows-based product that runs on the whole range of Focalpoint 3.0 platforms, provided of course that the PC is connected to a CD-ROM drive.

Car reservations

Car rental reservations are handled by Galileo's CarMaster system. This operates in a very similar way to that described for hotels. There are currently 47 car hire companies available in CarMaster and most of these have a world-wide network of servicing locations that number over 15,000, where cars can be collected and dropped off. Bookings with vendors, such as Hertz, Avis, Budget, British Car Rental, Eurodollar, Alamo, Europcar and Thrifty, can all be made in Galileo and fully integrated with airline reservations in the booking file. The main entries for CarMaster are shown in Table 4.3.

A great deal of standardization has been accomplished in the car hire area. There is, for example, a common four character coding system that identifies whether the car is an economy or compact size, an estate car or saloon, automatic or manual

Table 4.3 Galileo CarMaster entries

Entry	Meaning
CAA	Standard car availability
CAL	Availability from low to high rates
CAQ	Availability qualified by vendor, car type, rate
CAI	Index of vendors for a specified city
CAU	Update previous information
CAM	Modify dates, car types after sale

gearbox and air-conditioned or non-air-conditioned. The actual codes are as shown in Table 4.4.

General information

The Galileo Information System (GIS) provides a number of information pages that may be regarded as an electronic book for travel agents to use. The information is structured into chapters and pages, which are indexed for easy reference. The following are the main headings of information that are provided by GIS:

- Airline information
- Consulate information
- Country information
- Customer services
- Galileo and its services
- Galileo's product directory
- Help information
- Product overviews

One useful facility is the TIMATIC information service. This is operated by a Swiss-based company that assembles and maintains a large data base of essential travel related information. This is available to Galileo users via an on-line computer interconnection with the GCS. TIMATIC provides travel information on countries throughout the world and covers a wide variety of topics that are all kept current. It is organized rather like a book with chapters on different subjects. The chapters of TIMATIC are: health, visa, airport taxes, passport, customs, news and country (geography, customs and currency).

Finally, GIS provides an on-line encode/decode function to translate automatically the various codes used throughout the Galileo GDS. There are a multitude of these codes, many of which cannot be carried in a person's head. The main codes are for airports, airlines, aircraft types, countries and cities. The user simply keys in the text and GIS translates this either into a code or, if a code was entered originally, into the full textual name.

Computer-aided instruction

There are several pages of text stored in Galileo that comprise a self-teach course for travel agents. These pages enable an untrained user to undertake a self-paced learning exercise that can give them a good overview and a basic grounding in how to use Galileo. However, computer-aided instruction is designed to complement and support a programme of classroom training. It is not intended

Table 4.4 Galileo CarMaster types

Car size		Car type		Transmission		Air-conditioned	
M	Mini	B	Two-door	M	Manual	N	No
E	Economy	C	Two- or four-door	A	Automatic	Y	Yes
C	Compact	D	Four-door				
I	Intermediate	S	Sport				
S	Standard	T	Convertible				
F	Full size	X	Special				
P	Premium	W	Estate				
L	Luxury	V	Van				
X	Special	F	Four-wheel drive				
*	All sizes	R	Recreation				

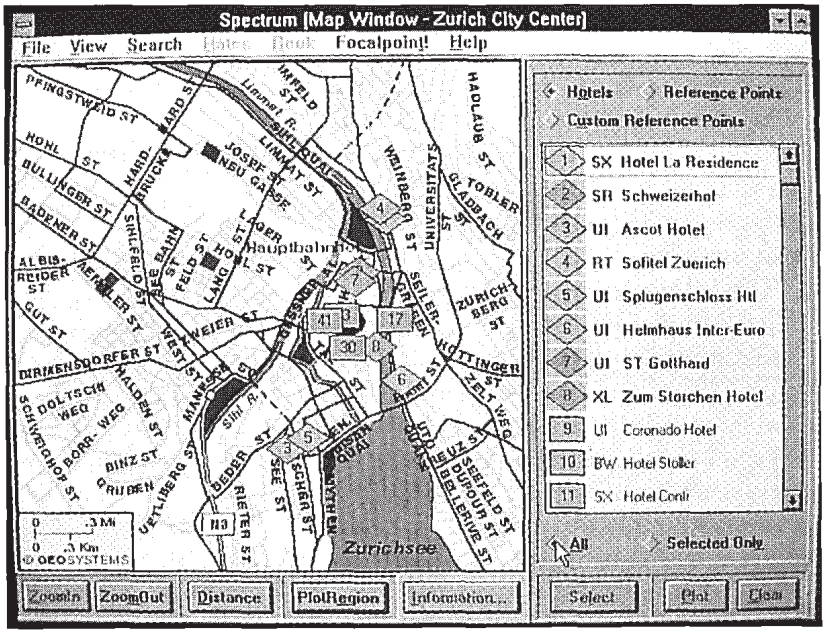

Figure 4.7 Galileo spectrum

to replace attendance at a course lead by a competent trainer who can impart many technical and non-technical aspects on how to use the Galileo GDS in a travel agency environment.

Product directory

Galileo's product directory is an ordered set of information concerning other non-air travel products. Some examples of services available in the product directory are theatre tickets, citicorp bank drafts, limousine services, UK chauffeured parking services and Columbus Insurance. The product information is entered and maintained by each participating supplier using a dedicate maintenance terminal supplied by Galileo. These services are available by entering 'PD' into any Galileo screen.

Once in the product directory, information is processed in a fashion that is very similar to a viewdata system (although the product directory is not a viewdata system itself). The product directory main menu is a directory that offers choices of: (a) a list of participating suppliers, (b) a list of suppliers by product category, and (c) a list of participants offering products in a particular city. Descriptions of the different products are stored in logically arranged sections that are accessed using sub-menus. Pages of information can be viewed and other pages requested for display. To book one of the products displayed, an electronic form is completed that is printed out at Galileo's operations headquarters. The printed copy of the electronic booking form is then sent to the supplier by facsimile transmission. From that point onwards the dialogue between the supplier and the travel agent may be either via the Galileo system or, as is often the case, handled off the system, usually by telephone or mail.

Other Galileo productivity functions

In addition to the core reservations functions described above, Galileo offers its travel agency customers some additional productivity enhancing tools. These fall into two main areas: (i) functions available on the Galileo Central System, and (ii) functions that are designed to run on the Focalpoint PCs that deliver Galileo's Central System functions to the user.

GCS productivity functions

A set of optional functions is available on the GCS that enables users to maximize their productivity. These functions are computer applications that actually run on the Galileo host computer system and are therefore available on a global basis:

- **Galileo's past date quick (PDQ)** This provides travel agents with access to booking files which may be up to 13 months old. The requested historical information is provided within a response time determined by the age of the file. Booking files that are from one to 60 days old are displayed immediately. Items that are more than 60 days old are displayed within 24 hours. The information retrieved may be displayed, put in a queue or printed. Search and selection criteria are also available to streamline the process.
- **Galileo's MIR** A Galileo MIR is a special message that contains all information about a booking. It is passed from Galileo into an agent's back-office system where it can be used for a variety of purposes, such as ticket printing, itinerary printing, accounting and management information reporting. Each Galileo MIR comprises over 700 data elements preformatted as an ASCII flat file, which may be transmitted securely to the back-office system in real-time. MIRs may be sent to a variety of locations, depending upon the needs of the individual agency. They may, for example, be sent into the back-office system in the office where the reservation was made or they may be sent to a central computer in cases where the agent operates a central group accounting and MIS system. The choice is the agent's. The MIR specification is available to any software company wishing to develop an interface to Galileo. At present there are over 300 software houses and travel agents currently working with Galileo International and its NDCs to integrate accounting solutions with the Galileo system for MIR data acquisition.
- **Galileo's selective access** Galileo allows travel agents to share customer information across different locations, sometimes across different countries of the world. Groups of agents known as affiliates may be formed and selective access partnerships established between them. These affiliations may be formed from within a travel agency's multi-branch network or between separate agencies that have formed a strategic partnership. The information that may be shared includes booking files, client files, documentation and queues. Access may be controlled at several pre-determined levels thus allowing only certain staff within an agency to access shared information about their customers.

Focalpoint productivity functions

Galileo has developed a number of applications that run within the Focalpoint PC system. These are in most cases applications that run in what I have described earlier as a co-operative processing environment. In other words, the applications use data from the GCS and add local processing functions to deliver enhanced services to users via a simple Windows based GUI. These functions are as follows:

- **Galileo's relay productivity tools** This is a set of tools that combines the features of Focalpoint with the flexibility of Microsoft Windows to bring productivity support to a travel agency user. It is available on any Focalpoint Version 3.0 or higher product and comprises the following functions:
  - *Queue Manager* Supports the handling of queues according to pre-determined agency rules. This allows booking files to be scheduled for action automatically at different times of the day and by different staff within the agency.
  - *Booking File to Client File* This allows a client file to be created automatically from a booking file, according to pre-determined rules set within the travel agency. The client files created in this way will all conform to a format determined by the agency and saves the repetitive entry of data.
  - *Response Capture* This is an advanced 'cut and paste' feature that allows information to be copied onto a clipboard from one or more of Galileo's windows and pasted into any other application such as, for example, Microsoft Word or Excel.
- **Focalpoint's Scriptwriter Plus** This is a Windows based Focalpoint product that allows a travel agent to automate the entries used by his/her staff to make a booking. A set of commands similar to a program code, called scripts, are used to define exactly how a booking is to be transacted. Each of these scripted functions is stored within the PC and represented on the screen as an icon. When a user clicks

on the icon, the script is executed and the user is prompted for certain entries. Scripts can be written to detect and store certain responses received from the GCS and to exchange data with applications using dynamic data exchange (DDE). This is a powerful way for a user to carry out automatically a complex booking transaction very quickly and with the minimum of key-strokes. It also is a way of reducing errors by using quality control checks on data before they are sent to Galileo.

There are three sub-products that comprise Scriptwriter Plus: (i) Scriptwriter Plus Build – which is used to create customized scripts for users, (ii) Scriptwriter Plus Run – an execution utility that enables scripts to be initiated from icons or the tool bar, and (iii) Scriptwriter Plus Convert – a conversion utility that allows scripts to be upgraded from one version to another. Scripts are fully configurable on installation thus allowing, for example, scripts to be written by head office and used by branches that do not have the authority to modify them.

- **Galileo's Premier** This is a Microsoft Windows based product designed for Focalpoint that allows travel agents to search and book hotels and car rental services. It is fully integrated with the RoomMaster and CarMaster central system functions. There are three major components:
  - *Itinerary View* the current booking file is retrieved from the GCS and re-formatted into an easy-to-read style. To book additional hotel or car products the user points and clicks on icons and the tool bar instead of entering more complex airline type commands.
  - *Premier Cars* an easy-to-use interface to CarMaster. This function retrieves previously stored information, such as the customer's corporate policy on car rental, frequent traveller details, licence requirements and insurance. Search criteria are automatically constructed from the itinerary information and CarMaster is used to find the services required.
  - *Premier Hotels* similar in concept to Premier Cars, this function provides a simple GUI to RoomMaster. This allows users to access specially negotiated room rates stored on their local Focalpoint systems and embed these into the reservations and booking process.

  Galileo is developing an enhancement to its Premier product that will extend its use to support airline bookings also. This will work in a similar way to the above – it will act as a GUI to the GCS and allow infrequent users to quickly master the system for all airline booking functions.
- **Galileo Travelpoint** This is a software product that is used by a travel agent's business house customers, who are usually sophisticated and frequent travellers. It provides travellers with access to Galileo via a simplified Windows-based GUI, but channels all reservation and ticket requests via the travel agent. It can be a useful tool for frequent travellers and can be implemented on their lap-top computers while allowing the travel agent to retain control of ticketing, MIS and quality control.

SABRE'S TRAVEL INFORMATION NETWORK

Sabre (Fig. 4.8) now represents the largest privately owned computer system in the world (the largest being the US Government's SAGE defence system). Sabre is one of the world's leading GDSs and is used in over 29,000 travel agency locations around

Figure 4.8 Sabre Europe logo

the globe. It is a system that enables its subscribers to check the availability and make reservations for seats on airline flights, hotel rooms, rental cars and many other travel-related products.

The Sabre system drives over 147,000 computer terminals of which 122,000 are located in travel agencies. The migration away from dumb terminals to PCs is well under way and at present over 90 per cent of the terminals used in these agency locations are now PCs. Most of these travel agency workstations are distributed throughout 64 countries in North America, Europe, South America, the Caribbean, Australia, Africa, the Middle East and Asia. In the UK there are over 750 locations using more than 4,000 Sabre terminals.

The history of Sabre

American Airlines' first automation program started in the 1930s with the 'request and reply' system. A travel agent would telephone a regional American Airlines central control point where inventory was maintained, to enquire about space available on a flight. A response would be returned via teletype. Through the mid-1940s, reservations were recorded manually using a pencil to mark up different coloured index cards known as 'Tiffany cards'. These cards were named after the famous lamps with the attractive coloured glass shades. These cards were arranged in a 'Lazy Susan', and flights were controlled by half a dozen employees sitting around a table spinning the 'Lazy Susan' for index cards that would correspond to particular flights. By counting the pencil marks on each card a clerk at the reservations centre could give a 'yes' or 'no' to a request for a seat.

In the larger reservations centres a wall-sized status board was installed to display seat space available on each flight. The board summarized much of the information on the index cards in the 'Lazy Susan'. As new reservations came in, workers at the table passed the information to 'board workers' who removed seats from a particular flight's inventory status until no seats remained. Using the Tiffany system to complete a booking for a round-trip reservation from New York City to Buffalo required 12 different people performing more than a dozen separate steps during a three hour period – longer than the flight itself took!

In 1946 American Airlines developed the Availability Reservisor, the industry's first electrical/mechanical device for controlling seat inventory. The Reservisor applied basic computer file technology to the task of keeping track of American's seats and flights. Even though it could not sell the seat or cancel a reservation, the system represented a milestone in adapting electronics to airline reservations.

By 1952 the airline had introduced basic magnetic storage technology – a random access memory drum and arithmetic capabilities – to the Reservisor. With the Magnetronic Reservisor a reservations agent could check seat availability and automatically sell or cancel seats on the electronic drum. As advanced as the Magnetronic Reservisor was for its time, the reservations process was still intensely manual. All passenger information was handwritten onto record cards and was kept separate from the seat inventory and reservations information. Clearly, the airline needed a better method for handling reservations and managing its inventory.

In 1953, a chance meeting of two Mr Smiths on the same American Airlines flight from Los Angeles to New York sparked off a series of technological innovations that eventually led to the development of Sabre, as we know it today. The first step along this evolutionary path was the development of a data processing system that would create a complete passenger record and make all the data available to any location throughout American's system. The end result of the conversation between C. R. Smith, American's president, and R. Blair-Smith, a senior sales representative for IBM, was an announcement on 5 November 1959 of a semi-automated business research environment, i.e. Sabre (Fig. 4.9).

Sabre enabled American for the first time to link (in a single electronic unit), a passenger name to a specific seat sold on an aeroplane. Sabre also made possible a link to passenger inventories in other CRSs thus laying the groundwork for the way airlines handle interline reservations today. In 1960 the initial computer centre was installed in Briarcliff Manor, New York, and Hartford became the first American Airlines office to use Sabre in 1963.

In its first year of operation Sabre could process 85,000 phone calls each day, 30,000 requests for fare quotations, 40,000 confirmed passenger

Figure 4.9 An early American Airlines reservations terminal

reservations, 30,000 queries to and from other airlines regarding seat space and 20,000 ticket sales. American's initial investment in the research, development and installation of Sabre was almost US$40 million – the price of four Boeing 707s at the time! By 1964 the USA telecommunications network of the Sabre system expanded from the east coast to the west coast and from Canada in the north to Mexico in the south. At that time, it was the largest real-time data processing system in the world.

Ten years later in 1974, American initiated a joint carrier feasibility study to explore the prospects for a CRS that could be owned and run by a joint venture of several leading USA airlines. This project received antitrust immunity from the Civil Aeronautics Board and included several other airlines. In 1975 a study group deemed the system economically practical but United Airlines withdrew from the project and announced its intention to provide travel agents with its own CRS. Because this system had schedule displays and connections biased in favour of United Airlines, the installation of United's CRS terminals posed a competitive threat to other airlines. Consequently American announced its intention to market its own reservation system. In May 1976 American Airlines installed its first Sabre unit in a travel agency. Such has been the success of the system that there are now more than 110,000 Sabre terminals installed in over 25,000 locations throughout 64 countries.

American Airlines' commitment to new technology extends well beyond the flight reservation systems. The systems operations centre (SOC) in Dallas is a prime example of the innovative use of technology. The SOC is home to a unique blend of human skills and IT systems that together enable the world's largest airline to operate all its flights smoothly and efficiently. The SOC is the nerve centre from which every single American Airlines flight is controlled. From the pre-flight planning of crew, food and fuel, through the load and balance calculations for take-off, to the weather charting and flight planning process. All this is undertaken by skilled and experienced airline and meteorological staff supported by an array of sophisticated technologies.

These technologies include over 400 Apple Macintosh workstations each with between 4 and 16 Mb or RAM with 100 Mb of hard disk connected into a fault tolerant Ethernet LAN with ten servers. Each of these workstations can display several windows showing weather maps and other graphical information as well as providing access to the flight operations system (FOS) that runs on a large main-frame computer. Knowledge-based systems are used in the Automated Load and Balance routines and the Hub Slashing application. This uses artificial intelligence to assist with decisions on which flights to cancel in complex situations arising from things as diverse as weather bound airports to defective equipment. Unfortunately it is outside the scope of this book to delve any more deeply into this fascinating side of airline flight operations and control. What we need to concentrate on, is that part of Sabre's technology that is of prime interest to travel and tourism practitioners; and this is the Sabre GDS.

Sabre

Sabre's corporate entity has undergone a substantial restructuring over the past few years in

order to: (a) position it to compete effectively on a global scale; and (b) distance itself from its founding parent, American Airlines, which is a separate business in its own right. The Sabre Group is therefore now a separate legal entity, listed on the New York stock exchange. It devolved from the AMR Corporation, the owner of American Airlines and its original founder, over the period 1992 to 1995. Following the flotation, the AMR Corporation retained a majority stake in The Sabre Group. This devolution to an independent publicly owned corporation gives The Sabre Group several significant strategic advantages including: (i) the flexibility to grow under its own control, (ii) the ability to explore a wider range of marketing opportunities, and (iii) access to a source of investment capital for growth and development. The Sabre Group itself comprises several operating divisions. These are:

- **The Sabre Travel Information Network (STIN)** This is the marketing arm of Sabre which sells the system to travel agents and travel suppliers around the world. More than 25,000 subscribers in over 64 countries world-wide access travel information through Sabre. STIN includes Sabre Europe, a subsidiary that controls several distribution companies in Europe, the Middle East and Africa. STIN employs 2,200 staff.
- **Sabre Interactive** This division encompasses emerging technologies. It provides a full range of information management services including: systems development, network design and management, telemarketing, reservations services and systems, data management and technical training. It employees some 5,000 staff.
- **Sabre Decision Technologies** This is a software business aimed mainly at supporting other airlines. It includes: (a) software applications development and project management; (b) application marketing of products, like flight scheduling software and yield management; and (c) decision support technologies that, for example, simulate airport terminal passenger movements for planning and evaluation purposes. This organization is also responsible for the development and application of Sabre functions. It employs 2,000 staff.
- **Sabre Computer Services (SCS)** This is the part of the business that actually runs the Sabre main-frame computers and is responsible for the co-hosting of over 40 airlines that use the Sabre system. It is also the data processing activity that develops and maintains Sabre. SCS is responsible for the assembly, custody, administration and protection of corporate telecommunications and computer-based information resources. It employs around 2,000 people.

Like most of the other three GDSs, gone are the days when the CRS was a sales tool for the airline business. Legislation has done away with all that. Nowadays, GDSs must be so unbiased that they are no longer regarded as a key part of the airline's sales and marketing function. Sabre's primary mission is therefore to increase the sales of its automation products. Hence it is important to emphasize that following the corporate restructuring exercise described above, Sabre's activities are no longer driven by the need to support the sales of American Airlines' seats. In fact only a few years ago, when airlines were experiencing one of the industry's worst recessions, Sabre regularly generated more profit than the American Airlines business itself.

Decentralized processing

In the early days of IT, back in the 1960s and 1970s, Sabre was accessed by travel agents who predominantly used dumb terminals for everyday access to Sabre. These terminals were connected to an office based communications controller that itself was connected via a dedicated communications line to the Sabre host main-frame computer. Terminals such as these possessed no inherent processing power of their own and relied solely on the Sabre main-frame system for all functions initiated by the user. In fact, there are still quite a few such agents around the world who use these devices for their day-to-day reservations purposes. However, for most travel agents, the new PC-based Sabre products are more productive, more user-friendly and are richer in functionality than the 'old' dumb terminal approach. Before we dive into an analysis of Sabre's new products, it is worth considering how this shift in GDS IT evolved.

One of the clear trends in IT over the past ten or even 20 years has been the decentralization of

computer processing power. The major reasons for this are as follows: (i) the power of processor chips has increased exponentially, (ii) the price of these chips has fallen in almost an inverse price/performance curve, and (iii) the physical size of circuitry and chips has shrunk to microscopic proportions. Evidence of these factors has been the widespread use of the ubiquitous PC. All of this has meant that more processing can be carried out closer to the end user, usually on their local PC.

So, the legacy main-frame computers on which the core airline reservation systems run, have seen some of their processing functions distributed to outlying PCs via global telecommunications networks. This phenomenon is called co-operative processing and it uses distributed PCs to make it work. Even if the main-frame systems do not shed any functionality, the distributed processors can do a lot more local checking and validating of users' entries long before transactions actually hit the host system. This local validation processing generates several important benefits, such as: (i) lower transaction volumes because many erroneous entries are trapped locally and not even sent to the main-frame; (ii) reduced processing load on the main-frame because much of the validation checks and error detection/reporting/correction functions are undertaken locally on the PC; and (iii) faster response times for the user because data entry and validation transactions do not have to be transmitted across a network and are instead performed locally, which supports an almost instantaneous response.

Then there are the added user interface benefits. Local PC processors allow the unfriendly face of the main-frame to be replaced by a GUI. The problem with a lot of legacy main-frame systems is that they are usually very user un-friendly. They often require complex entries to be made by users, which often bear a remarkable resemblance to computer programming instructions. These coded entries are difficult for users to remember, are susceptible to mis-keying errors and require lengthy training courses. However, local PCs can act as interpreters for the main-frame and therefore offer the user many benefits including: (i) a far easier interface that is quicker to use and generates fewer mis-keying entries, (ii) the automatic generation of certain fields that historically had to be laboriously keyed by the user, and (iii) less training before the user can become a proficient operator.

So, the trend is clearly away from dumb terminals and towards a co-operative processing architecture that uses a combination of legacy main-frame systems and local PCs. Evidence of this trend can be clearly seen in virtually any travel agent's office. Although dumb terminals were the norm right up to the 1980s, in the 1990s travel agents gradually replaced them with PCs linked to GDSs. Nevertheless, the Sabre central system is a massive computer facility. The main site is based in Tulsa, Oklahoma, and a major portion of this facility has been designed to withstand both natural and man-made catastrophes. It uses 17 main-frame computers to deliver 4,000 MIPS of processing power with 15.3 Tb of storage. These computers are housed in a high security data centre with 11 km^2 of floor space. The networking capabilities are equally impressive with 180 communications processors and numerous mid-range UNIX-based computers. Over 200,000 PCs are managed and a voice network comprising over 45,000 telephone numbers and 10,000 voice mail boxes generate over 115 million calls each year.

Now, it is time to consider the range of products offered by Sabre to its subscribers around the world. There are several products that I describe here and all of them use a combination of: (a) PCs as the primary travel agent's workstation, and (b) functions provided by the Sabre main-frame core system. But before we can begin to understand Sabre's end-user products, it is essential first to understand something about the core reservation engine that drives the Sabre GDS. Understanding Sabre's core functionality provides a solid foundation for exploring the many front-end products marketed to the travel industry by this major GDS.

Sabre functionality

The Sabre core system runs on an extremely large main-frame computer that is situated in an underground bunker in Tulsa, Oklahoma. This system has two types of functions. First there are the back-end functions that are concerned with Sabre's connections to other airline reservation systems. Then there are the front-end functions that provide access to the Sabre system by travel agents

and other users, such as regional American Airlines reservation offices. Let's review the back-end functions first.

Sabre's back-end functions

Sabre is connected to a large number of other CRSs via direct computer-to-computer links. Each link is supported by a set of complex computer functions that themselves have various degrees of sophistication. The degree of sophistication depends upon several factors, such as: (a) the functional capabilities of the participating CRS, (b) the price that the participating airline wishes to pay Sabre for participating in their GDS, and (c) the communications network used to connect into Sabre. The terminology that covers this aspect of Sabre's intra-CRS connections goes under the banner of 'levels of participation'. The reason it is so important to understand the various levels of Sabre's CRS participation, is because it is the dominant factor affecting the displays and functions that subscribers experience when they use Sabre.

Sabre therefore provides its airline customers with several options regarding the precise way in which they participate in the Sabre system. The most basic level is the basic booking request (BBR), which is a relatively new service designed for smaller airlines requiring only the simplest of booking functions at a low cost. It uses on-line two-way communications for reservation request messages, but the timing of responses is not immediate. The standard level of participation is called Full Availability and this is the service used by the majority of airlines connected to Sabre. In addition to this there is a set of optional services, which falls under the umbrella of what Sabre calls Total Access. Total Access therefore comprises several different sub-levels of participation, which are described as follows:

- **Direct Access** With Direct Access, Sabre communicates directly with the other airline CRSs and 'takes' the required seat(s) from the airlines' inventories. This provides last seat availability.
- **Multi-Access** This is a form of participation that is similar in many ways to Direct Access. The difference here is that the user must bypass Sabre and use the airline system that is being accessed. Although the Sabre common language can be used for outbound entries, the inbound displays received from the multi-access host will be displayed in native format, i.e. non-Sabre format. Multi-Access provides last seat availability.
- **Answer Back** This is a kind of enhanced messaging system. In this case, the participating airline sends a two-character answer-back code to Sabre via a teletype message, i.e. something like a telex message, confirming that the reservation has been successfully made within its own system. Sabre updates its PNR with this answer-back code. This gives the travel-agency user (not to mention the traveller), a degree of comfort that the reservation has actually been made in the other airline's system. However, it is possible for a reservation to be withdrawn even after confirmation and so Answer Back is not the optimum level of participation.
- **Direct Connect** This is the premier level of participation and is sometimes known as 'Seamless Connectivity'. Instead of the participating airline sending just a two-character confirmation code, it actually sends its PNR locator reference. This is automatically added to the Sabre PNR. With the other airline's locator embedded within the Sabre PNR, the booking is not only as secure as it could ever be, but there is a speedy reference point into the other airline's system should enquiries ever need to be made, or a ticket needs to be collected on departure. With Direct Connect it is possible to sell a seat from an availability display that actually shows zero seats available. This is because although the availability display sent from the participating airline shows no seats available, Sabre can 'go into' the airline's system and if there is a seat left, it will take it.
- **Direct Connect Availability** Otherwise known as Seamless Availability, this is the ultimate level of participation that another airline may have with Sabre. It provides the user with a real-time availability display using information obtained directly from the participating airline's reservation system.

When a reservation is made in Sabre, a PNR is created and this is given a PNR locator code. This

may be used to retrieve the PNR on subsequent occasions, although the PNR may also be retrieved on entry of the travellers name. A Sabre PNR generally contains details of all products booked via Sabre, even though some of them may in fact be non-air segments delivered by non-Sabre host systems, e.g. hotel reservations, rail reservations and car bookings. That brings us nicely on to non-air host systems that are connected to Sabre.

Non-air hosts

The term 'Sabre central hosting' summarizes the architectural principle that is the cornerstone of Sabre's non-air host development program. This principle is based upon connecting all non-air supplier computer systems, no matter where they are located, directly to the Sabre host computer in Tulsa. Centralizing these connections allows Sabre to distribute all non-air host systems to its population of users located around the world. Consequently, Sabre has developed a range of new non-air products for each marketing region of the world. In Europe, for example, the project name is European local vendor access (ELVA). The objective of this product is to make Sabre more of an attractive utility to travel agents who book a fair amount of leisure travel business.

Some GDSs connect local non-air systems to their nearest national node. While this is fine for local access from within a country, it is not always suitable for global access. Take the following hypothetical situation. Say that a French non-air supplier's booking system needed to be connected to Sabre. One might think that this could be done via Sabre's node in Paris. Such a solution would seem at first glance to be perfectly satisfactory because it would appear to provide access for all Sabre users within France. But this is not how Sabre works. If, for example, access were required to the supplier's system from Sabre users in say Italy, then the switching technology required in France would be complex and costly for Sabre to implement. So, the Sabre national node in France does not have a switching capability and instead the French supplier's system would be directly connected to Sabre's GDS central switch in the USA. This illustrates the arguments that Sabre uses for its policy of central hosting for non-air suppliers.

It is for reasons such as these, that Sabre has adopted a policy of central hosting for all non-air suppliers. This means that non-air supplier booking computers are always connected to Sabre's central switch in the USA. An architecture such as this allows any Sabre user, no matter where they are located, to have access to the central non-air host system, provided of course that they have the appropriate authorizations and access privileges to allow this.

In the USA, travel agents are highly focused on three core travel products: airline seats, hotel accommodation and car rental; with cruise lines a close fourth. Sabre has, for many years, had a range of these non-air suppliers connected to its central system. However, in Europe, the travel pattern is different and many travel agents also require access to additional travel suppliers. Examples include: rail companies, tour operators and ferry companies. The ELVA project has now widened the span of Sabre in Europe by adding many new non-air suppliers including, for instance, SNCF, the French rail operator (and thereby the Eurostar cross-channel service), tour operators and ferry companies. New suppliers are being added to Sabre all the time. For example, there are one or two leading ferry operators who have already agreed to connect their systems to Sabre under the banner of Sabre Navigator, e.g. P&O Ferries. Also, several leading European tour operators will be joining the list of Sabre leisure travel host systems under the banner of Sabre TourGuide. There are even plans afoot to connect other rail services into Sabre.

Non-air suppliers are invariably connected into Sabre using the Multi-Access level of participation. Just to refresh your memory, this means that the user 'talks' to the non-air supplier in the native host 'language' of their booking computer system. In other words, Sabre does not undertake any translation in an attempt to communicate with the user in a common 'Sabre type' language. This has the benefit of allowing the user access to the full range of functions and commands that are available in the non-air host system. However, Sabre does apply some intelligence to the booking process by combining and integrating all booking segments into a single PNR for the passenger. So, if the passenger's trip involved a flight, a car rental,

a train journey and a ferry crossing then all of these services would be stored in a single PNR for the trip. In the future it should also be possible to request availability between two cities, say London and Paris, and see a Sabre display showing rail and channel tunnel services alongside airline flights.

More recently, Sabre has launched a new booking service called Direct Request for Hotels, aimed principally at the smaller hotel and bed and breakfast establishments (SMEs). These properties do not usually have on-line reservation systems of their own. So, Sabre has adapted straightforward fax technology to communicate with these SMEs. This opens up sales opportunities from over 29,000 travel agencies around the world that are Sabre subscribers. Sabre includes participating SMEs in its hotel availability displays. Then, when a booking is made by a Sabre subscriber, the central host system automatically generates a fax message that is sent directly to the SME. Once received, the SME fills in the appropriate fields and faxes the fax back to Sabre. The Sabre system then electronically reads the incoming fax using optical character recognition (OCR) technology. The decoded information is then used to update the PNR booking record, which may be viewed and acted upon by the originating travel agent.

Finally, there is a wealth of information stored within Sabre that is available to its users. The following are just some of the topics available via Sabre: (a) theatre information and seat bookings, (b) tourist information on countries and regions, and (c) information on national governments and health/visa requirements of their countries.

Well, that completes our brief review of Sabre's back-end functionality. Now let's see how these host systems, including the vast information resource stored on Sabre's central data base, are distributed to subscribers around the world. Distribution of Sabre is effected by several inter-linked front-end systems, each with its own set of associated products.

Sabre's front-end functions

Sabre's front-end core functions are the driving force for its many travel industry products. Only by understanding these functions can we expect to appreciate these new 'look and feel' products in detail. It is therefore necessary first of all to examine the basic reservation functions at Sabre's core, so that we can understand how it is that they can be made to look so simple within a distributed processing environment.

In many ways, the front-end core system doesn't need to know what kind of workstation is hanging on the other end of the line. It may be a dumb terminal or a PC running any one of Sabre's new products, such as Sabre For Windows, Turbo Sabre, Planet Sabre or Travelocity (Sabre's Internet product – see Chapter 5). As far as the front-end core system is concerned, the entries and the responses it processes are identical. The functions that comprise this front-end core system go under the banner of Professional Sabre. It doesn't matter what front-end product you are using, it is Professional Sabre (or a sub-set thereof), that you will actually be interacting with on the Sabre host main-frame. This is the reason why I have chosen to use a review of Professional Sabre as our springboard for understanding Sabre and its full range of GDS products.

Professional Sabre

Professional Sabre has the most comprehensive set of functions available to non-AMR users who are of course in the main, travel agents. Let's start by considering the use of Professional Sabre as accessed from a dumb computer terminal. If we can grasp how these core functions are performed at this level then it will be far easier to understand how the more sophisticated products work. Most of the basic system functions in Sabre are initiated by depressing a number on the keyboard. Each number has a certain function and these are described in more detail as follows:

- **1 Availability** This is probably the most frequently used function of all. As the name implies it allows a user to enquire about the availability of a specific flight or to review the various services between two cities. Participating Total Access hosts allow last seat availability and guaranteed bookings. All that is needed for a minimum availability request entry is the date of travel and the city pairs. The system responds with a list of flights in the sequence recommended by the ECAC CRS Code of Conduct (see Chapter 1), i.e.

- *First*: Direct flights in departure time order.
- *Second*: Flights with stops but same flight numbers.
- *Third*: Connecting flights in sequence by the most direct route.

- **2 FliFlo** This entry is used to obtain flight information for participating carriers. The information is presented in real-time, which means that it is up-to-date. It shows such information as the latest estimated (and actual) arrival and departure times, the flying time between two cities, the weather *en route* and so on.
- **3 GFAX** Otherwise known as other service information (OSI) and/or special service request (SSR). OSI messages do not require a response, whereas SSR entries do. This is how you request special services that are needed on a non-American Airlines flight by your customer. Services such as special meals, seat requests, meet and assist, and so on. Incidentally American Airlines offers over 30 different types of meals that if ordered 24 hours in advance can be served on the flight, from low lactose meals to an all-American burger!
- **4 AFAX** This entry is made when a response from American Airlines is needed. AFAX is used to request SSRs from American Airlines or send OSI information. Replies to GFAX SSRs are sent to AFAX. When the reply is received, Sabre stores it as part of the PNR. It may subsequently be recalled and displayed by the AFAX entry.
- **5 Remarks** Besides the obvious use for this entry, coded remarks are supported. This means that the user need only enter a shorthand code in order to make a special remark appear on a PNR, a ticket, an itinerary or an invoice. Examples of some common entries are the passenger's address and the form of payment.
- **6 Received field** Each time the PNR is accessed and changed by the travel agent, an entry is made in the history file. The Received field is used to store data that are added to indicate who authorized the booking, or who requested a change, etc. It is a mandatory field for the original booking and also for certain changes. This is useful when a passenger says 'I never asked for that service to be provided'. With a PNR history, the travel agent can always display the precise sequence of events that led to the current status of the booking. In fact a '6' field must be entered before a PNR can be finalized, e.g. an 'E' after the '6' field entry, ends the transaction.
- **7 Ticketing field** This field contains ticket instructions that must be entered prior to ticketing, and after ticketing has taken place it is updated to contain certain ticket-related data. Besides the basic reservations information held in the PNR, there are certain key fields that are needed for ticketing and these are: the airline code that designates the ticketed carrier, the commission rate (per cent), the form of payment and the baggage allowance. The ticketing field is a sophisticated function that is impossible to cover fully in just a short section of this book. Suffice it to say that Sabre maintains a diary of ticketing actions and updates this part of the PNR automatically.
- **8 Ticketing time limit field** This field is used to record a time limit beyond which the PNR is cancelled if a ticket has not been printed. When ticketing does occur, the ticket field (see above) is updated to reflect the new status and this ticketing time limit field is eliminated.
- **9 Phone/contact field** This field contains details of how the traveller may be contacted. It may be entered automatically by the Sabre host main-frame system from some previously recorded customer profile information held in a storage area called special traveller account record (STAR), which I will be covering in more detail later. Alternatively it may be entered at the time of booking by the travel agent.
- **0 Sell or reserve a product** Finally, the field that allows a travel agent actually to sell an airline seat or other product. The field entries are simply the class of travel and the line number of the availability display that contains the details of the flight (or other product).

There are a few other keys that have special significance and I will cover these briefly here. First, to cancel a segment the character 'X' is used, followed by the segment that is to be cancelled. So, for example, entering X3 would cause the third

segment of the itinerary to be cancelled; and entering XI would cause the entire itinerary to be cancelled. A '/', i.e. a slash, allows a segment to be inserted into the itinerary; a '.', i.e. a full stop, changes the segment's status; and a ',', i.e. a comma, allows a new number of passengers to be entered, e.g. four were originally booked, one is to drop out and so the new number of passengers is three but the itinerary details remain the same.

This sounds quite complicated and one may ask why is it necessary to use all these peculiar combinations of characters to mean so many different things. The reason is partly historical and partly practical. For historical reasons, the original Sabre system was designed to use a single character to denote a specific function and from a practical view, the use of a single character is fast. It just takes a bit of getting used to really. But there are more functions available via the keyboard:

- **Programmable function keys (PF keys)** PF keys are a powerful productivity tool. PF keys are the set of keys on a keyboard that are usually located across the very top of the keyboard. There are 12 PF keys on most modern keyboards, which together with the shift key enable 24 PF keys to be available to workstation users. These keys are available to be used by the application that happens to be running in the terminal controller at the time. Each PF key may be used to store a set of functions equivalent to several key depressions. Each PF key may be programmed a different way by its user. So, for example, a travel agent sales person may decide to set their PF keys up one way, whereas a colleague in the same agency may set their PF keys up another way. It is, however, usually the case that a standard is decided upon in an agency of any size, so that people can move from one workstation to another without having to re-designate the PF keys.
- **Special traveller account record system (STARS)** STARS is known in other systems by the term *profiles*. Sabre's STARS is widely regarded in the travel agency industry as one of the most powerful features of the system. Each STARS record supports the storage of up to 200 lines of information. By using the STARS facility wisely, a travel agent can gain substantial productivity advantages and greatly enhance the level of personal service provided to customers. In essence STARS is lines of information that may be moved automatically into a traveller's PNR by the travel agent making the reservation. The data are maintained under the complete control of the travel agent. STARS is usually used to keep a file of reference information on each company and frequent flyers, with whom a fair amount of repeat business is transacted. This allows information to be copied into PNRs effortlessly and for the agent to demonstrate effectively to the customer that they really do know a lot about them. There are three levels of STARS:
  - *Level 0: The travel agent profile* This contains the basic static information that describes the travel agency. Items of information such as the agency's name, address, telephone number and other items of reference information. There is therefore only one Level 0 STAR for each travel agency location.
  - *Level 1: Company STAR* This is a collection of information that describes a business travel account customer. It would normally contain details about the head office of the company to which the travel agent provided business travel services; name, address, telephone, etc. This Level 1 STAR may also be used to store the details of an individual who is a frequent customer of the travel agency but who does not work for a particular company.
  - *Level 2: Individual traveller STAR* All the employees of a company have a single STAR record each. This is associated with the Level 1 STAR for their company and describes the traveller in detail. Identification information is stored along with the preferences of the individual concerned. Examples of individual preferences include: vegan, smoker, aisle sitter and window gazer. Other STAR fields are the form of payment and the traveller's department code.
- **Sabre Scribe** Another powerful facility to tailor Sabre for an individual user or a travel agency is the script facility. This allows a 'fill in the blanks' format to be defined for a

particular job. An example of when this would be useful is for capturing a number of repetitions of a similar transaction. Or for capturing a standard set of management information fields for a specific company booking. A script can be set up so that when recalled, a kind of electronic form is presented on the screen to the user. The cursor is positioned next to the field to be entered and when this has been input, it moves on to the next field and so on until all data have been entered. Nine pre-programmed scripts are provided with the basic Sabre Scribe product; others can be set up to meet specific user requirements.

- **User defined interface data (UDID)** Also available as an important tool to help tailor Sabre for a travel agent's own particular needs is the UDID facility. A UDID is a special kind of remarks field in Sabre. It can, however, be interpreted by a back-office computer system that is programmed to recognize certain UDID fields. A UDID entry can be used to record special information within Sabre and format a record or part of a record that will automatically be fed into a back-office system. Each UDID is assigned a label that, when entered, allows the data that follows to be associated with that UDID for later processing.

A good example of UDID usage in practice, is the entry of a corporate customer's travel requisition request number as part of a booking. A travel requisition incidentally, is a form used by many companies to enable a traveller to obtain the necessary in-house approvals from management, in order to make the trip. This is usually a paper-based form although with the increasing popularity of e-mail, this is fast becoming an electronic 'document'. When the reservation is made, the traveller specifies the travel requisition number that is entered by the agent, for example, as the UDID entry '5.U1.-AT1476'. This causes the travel requisition code AT1476 to be stored in the PNR. At ticketing time, the ticket interface record is transmitted into the back-office system which is programmed to search each incoming record for a field identifier of 'U1'. When it finds this, it knows that the following data is the travel requisition number. This number can then be extracted from the ticketing record and stored on the back-office system's MIS data base for later reporting.

It is also possible to get even more sophisticated and combine Sabre Scribe with the UDID facility. This enables the UDID field to be edited by Sabre at the time of entry. In our example above, the UDID entry could be checked by Sabre Scribe to ensure that it was six characters long and that the last four characters were numeric only. Using this approach Sabre can be virtually pre-programmed to capture the precise information needed by the travel agent's business travel customers. This illustrates the labour saving and customization facilities that Sabre's UDID and script features provide a travel agent.

- **Ticketing** The control over Sabre ticketing is provided by the host main-frame computer. In a dumb terminal environment, such as the one we are considering here, the ticket printer is connected to the Sabre communications controller installed in the travel agency. At the time a ticket is printed the user can also request an invoice and/or an itinerary to be printed. The ticket printed by Sabre in this environment is called the Phase 3 continuous stationery ticket.
- **Back-office interface** Whenever a transaction is invoiced or a ticket is printed by Sabre, the data can be stored for transmission into a back-office system. The repository for this information is called DWLIST. This is really a special kind of file that is stored on the Sabre host and that can be downloaded into the back-office system via the agency gateway on the file server. In fact this download process can either be interactive, i.e. it is done as soon as a ticket is printed, or it can be done in batch at certain times of the day. Sabre can interface to a wide variety of industry back-office systems including, for example, Galileo's PAMS!
- **Leisure travel support** The Sabretext product supports access to leisure travel supplier's reservation systems that are based on videotex technology, from a Sabre PC workstation. This is effected via the X25 link from the travel agency to the Sabre gateway that controls the type of access. The access from the Sabre gateway may be either direct into Sabre or in the case

Table 4.5 A summary of Sabre products

Market segment	*Segment classification*	*Sabre product*
Travel agents	Agents with an average mix of leisure and business travel bookings	Professional Sabre Dial Sabre Sabre With Windows Sabre For Windows 95 Planet Sabre
	Agents with a large volume of business travel bookings	Turbo Sabre
	Agents with their own in-house booking systems	Sabre EDI Gateway
Corporates	–	Commercial Sabre (USA only) Business Travel Solutions SabreExpress SabreExpress Fax SabreExpress Mail
Consumers	–	EasySabre (USA only) Travelocity (USA only)

of Sabretext, directly into the Istel network. AT&T Istel supports a number of viewdata leisure travel reservation systems that are connected to it. In Sabretext mode, the workstation acts just like a viewdata terminal.

- **Concierge** This is Sabre's general information system. It is supplied from a variety of sources, as well as Sabre itself. A virtual travel related encyclopaedia of useful facts can be accessed on a wide range of subjects including, for instance, health, visa, weather, geography and tourist information.

Sabre's front-end products

As mentioned earlier, the core Sabre front-end system is capable of being accessed in a number of different ways by different types of users; and the profile of the average travel-agency user is changing quite radically. It used to be the case that the focus of required skills needed to make a good travel sales person (or travel counsellor as they are sometimes known), were largely technically oriented. For example, many advertisements for travel sales positions stated the need for applicants to be skilled in a particular GDS system. This is not quite as important a requirement as it used to be, chiefly because: (a) systems have become, or at least are becoming, far easier to use; (b) the time required for training a new user has decreased substantially with the newer GUI and intuitive systems now widely used in travel agencies; and (c) there is a more pressing need for travel sales staff to be experts in the field of travel itself (or at least to know where to look for travel information), rather than computer experts. In fact it is widely assumed that, as a result of today's modern education, young recruits are anyway sufficiently computer literate. However, the users of Sabre are not restricted to travel agents.

Following some in-depth market research, Sabre has segmented its users into three main types: (i) travel agents; (ii) companies, otherwise known as corporates in Sabre terminology; and (iii) individual consumers. A complete range of products has been developed for each of these market segments. This product segmentation is usually achieved by means of: (a) local processing carried out in the user's Sabre PC, and (b) 'filters' that have been built into Sabre's front-end system. As a result of this, there are therefore several Sabre reservation products, each of which has its own brand name and is aimed at a particular section of the market. Some of these products have been around for several years while others are only just

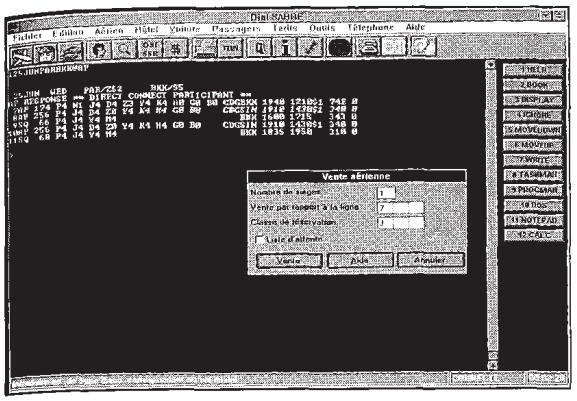

Figure 4.10 Dial Sabre

being introduced. However, Sabre has a policy of supporting all established products for the foreseeable future, i.e. in IT terms. The main Sabre reservation products are summarized in Table 4.5.

The reason for the growth in new and innovative Sabre front-end products is the benefits that PC GUIs bring to end users. The core Professional Sabre commands are concise and efficient in terms of system resource usage, but at the same time they are complex, difficult to remember and error prone from the user's viewpoint. Also, some hotel commands entered via Sabre can be over 40 characters in length; and with each character having a specific meaning, this represents a source of errors, mis-understandings and repetitive training needs. As a result, most users only remember the formats of between 30 and 40 per cent of Sabre's available functions. The other less frequently used but nevertheless very useful functions, are just not memorized. So, Sabre has introduced a series of evolutionary GUI-based products that are summarised in the above figure and that are presented below in a little more detail.

Travel agents

Sabre has designed a set of products especially for its main subscriber base, which is the travel agents of the world. There is virtually a customized product for each of the main types of agency (see Chapter 7). These products range from those providing simple, easy to use features that can be slower to use, up to the faster versions that require more training to use effectively. The travel agency products are:

- **Professional Sabre** This is the name of the product that is used by travel agents who do not have PCs. Professional Sabre is covered in the preceding section in greater detail. The functionality of this core system is, however, enhanced by co-operative PC processing that allows the following products to be supported.
- **Dial Sabre** This product is designed for the infrequent Sabre user, often smaller travel agencies, who cannot justify a dedicated reservation terminal. As such it is designed mainly for small independent travel agents, especially those concentrating on the leisure market. It supports only a limited set of the entire range of Sabre functions (Fig. 4.10).
- **Sabre for DOS** The advent of cheap and widely available PC technology has provided Sabre with an ideal opportunity to make its reservations product even easier to use and more sophisticated than was possible using dumb terminals. Sabre for DOS has been in use for several years now although it has recently been superseded by the Microsoft Windows family of operating systems. The product is more precisely identified as Sabre System 5.0 Enhanced Software for DOS Version 3.3 or higher (in actual fact, Sabre Revision 5.1 is now available). Any IBM compatible PC may be used to run Sabre for DOS and the product may also be used on a LAN. The screen is subdivided into several parts, which are generally as follows:
  - *Memo area* This is a coloured rectangular area (usually blue) located at the very top of the screen, which is a kind of electronic memo pad. Its purpose is to allow the travel-agency user to display a message on the screen. This can be useful when the workstation is unattended for a period of time and the operator needs to leave a message for a colleague.
  - *Function key labels* Function keys provide some powerful pre-programmed functions that may be specified by the workstation user. Whenever these functions need to be performed, a single key depression will execute them. A tall thin rectangular area on the right-hand side of the screen is reserved for a display of the function keys and their meaning.

- *Work area* This is a large almost square area in the middle of the screen, which is the main work area. This is the area where the user keys the Sabre entries and sees the displays that are sent from the host system.
- *Mode* There is a small block at the bottom of the screen that shows which mode is being used to access Sabre. This could show, for example, Professional Sabre, Sabre Scribe, etc.
- *Clock and date* These two useful reference fields are displayed in the bottom right-hand corner of the screen and are self-explanatory.

Additionally, the depression of certain keys causes a calendar and a calculator to be displayed. The calendar is a very useful feature because it is automatically updated by the PC's internal clock powered by a small long-life battery that is continuously running. The calculator displays an image of what a typical calculator looks like with buttons for numbers and the common arithmetic functions. These buttons are 'pressed' by selecting them on the keyboard.

- **Sabre With Windows** This is a product that was launched world-wide in April 1993. It was rolled out in the UK and the rest of Europe by mid-1993. Sabre With Windows really does make the PC more than just a dumb terminal emulator. Besides providing an extremely user-friendly front-end to the Sabre host system, the PC can run any Microsoft Windows Version 3.1 compatible software at the same time. Any PC that is IBM compatible can run Microsoft Windows Version 3.1 or higher as supplied by Sabre. An industry standard version of Microsoft Windows is provided as part of the Sabre With Windows product. The plain vanilla version of Windows 3.1 has been enhanced as the result of a joint effort between Sabre and Microsoft. This has produced a version of Windows that enables the user to get the most out of Sabre and yet be able to run industry standard Windows 3.1 compatible software without any special modification. Sabre is simply just another software product that can be loaded and accessed via standard Windows.

  A common question often asked by travel agents is: What benefits do I get from Sabre With Windows? This is a good question but there is an equally good answer to it – a lot of extra functionality that can generate a higher level of productivity! The following are just some of the advantages of using a Windows environment:

  - *Multi-tasking* First, there is the multi-tasking capability. Multi-tasking means that you can run several programs at one time. It is possible, for example, to have Sabre available in one window, a client file from your back-office system in another window and a word processor in a third window. Your PC might be printing a report as you are accessing Sabre. The overall reason you might want to take advantage of multi-tasking, for example, is so that you can build a personalized itinerary for a customer and produce a quotation for them.

    Multi-tasking allows you to add 'boiler-plate' text to the document and put a few finishing touches to it before storing and printing it. With Windows, you just start the printer off and then you are free to do something else. The Windows multi-tasking software takes care of controlling the physical printing while you get on with another customer proposal or make another reservation.
  - *Clipboard* This is where the second powerful Windows facility comes into its own; the Clipboard. The clipboard is a standard feature of Microsoft Windows and it allows you to select and copy information from one window and insert or paste it into another. So, you could, for example use the Sabre window to build an itinerary for the customer using the availability displays and other features that I have described above. Then you could copy the relevant pieces of the itinerary, swap into the word processing window and paste the itinerary into a document. Then you could activate the back-office system window and display the relevant client file that contains all the static information about your customer. Once again you could copy the appropriate information on say name, address, telephone number and special preferences, swap windows back to the word-processor and paste the information into the document you are building.

The Microsoft Windows Program Manager is the front screen for Windows. Besides the standard Microsoft windows containing various general program functions, there is a Sabre window. This shows several icons, each of which when double clicked with the mouse, offers some important services to the user. It would be impossible to cover the richness and depth of these functions in this book. It must therefore be borne in mind that the following description covers these areas in very general terms only:

- *Sabre utilities* The first of these utilities is network security, an often overlooked yet very important subject. Sabre network security is provided by Novell LAN software. This controls which groups of functions are accessible by the user of the workstation, the rights granted to users in terms of whether they can read or write to certain sensitive files and a directory of users. LAN diagnostics are also presented pictorially. An actual image of the LAN in the agency is shown, which is a powerful tool for use by the supervisor within the agency.
- *Sabre applications* A calculator and a calendar, just like with Sabre for DOS as described above. The only difference here is that the user is free to use a mouse instead of (or in addition to), the keyboard.
- *Gateway to Sabre With Windows* Besides providing a gateway to the core Sabre system as described in the main body of this section, several other peripheral functions are offered in this window. A revision history of the Sabre software used by the travel agent is available. This is especially useful in ensuring that the travel agent is using the latest version and has loaded the latest set of updates. It is surprising how often this is overlooked and it can cause some horrendous problems if not done properly. User information is provided that shows who is logged in and what peripheral devices, such as printers, are doing – a sort of 'big brother is watching you', kind of a function that is so loved by the agency supervisor! Then there are the Sabre With Windows tutorials and help functions: (i) About Sabre With Windows – a general introduction and overview of the product and the functions available at a general level; (ii) Getting Started – an overview of the basic entries that are, for instance, needed to obtain an availability display and make a simple reservation; and (iii) Practising Sabre With Windows – an extremely useful facility that enables a new user to practise most of the Sabre entries without any danger of impacting the live system.
- *Sabre Help* This, as the name implies, provides information on certain subjects that are needed to accomplish a task that the user is unsure about or needs a quick refresher. It is a powerful support facility that can be accessed in a number of ways. First, it is like a book in that there are certain headings and sub-headings that can be accessed via a kind of table of contents. Then there is context sensitive help, which is probably one of the product's strongest benefits. When a user gets to a point in the transaction at which further information is needed to complete it, the depression of the 'Ctrl' and 'H' keys initiates Sabre's context sensitive help function. The system looks at the current entries and extracts what it considers to be the most relevant section of the help text that is most likely to address the user's problem. A diskette is periodically distributed by Sabre with updated help information recorded on it. This is loaded into the system and is then available to users.

The Windows approach enables Sabre to provide not just an easy to use interface but also one that can be tailored to each country of the world in which it operates. This functionality is one of the in-built functions of Microsoft Windows. So, although the core Sabre host system is the same, no matter where it is accessed, the PC running Windows can be set up to display standard workstation responses in the national language, e.g. Help Tutorials, Windows Help, Sabre With Windows Help and Sabre Help; and this includes Japanese Kanji symbols too. It is probably fair to say that Sabre With Windows is a strategic product that will be around for many years to come and will continue to be enhanced and refined.

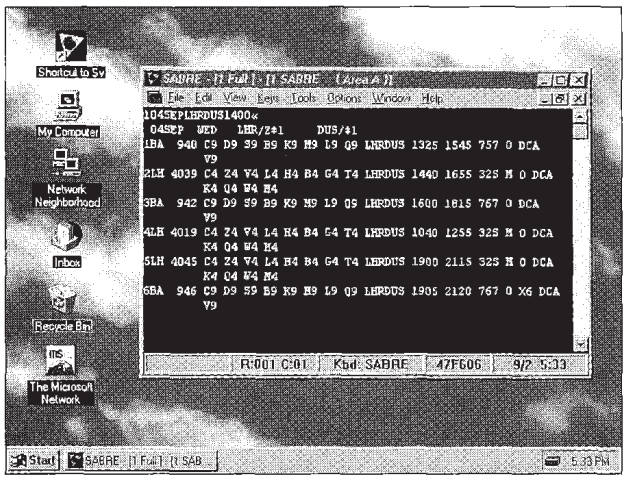

Figure 4.11 Sabre for Windows 95

Figure 4.12 Planet Sabre (logo)

- **Sabre For Windows 95** As the name implies, this is a version that runs under the Microsoft Windows 95 PC operating system. It is, however, generally the same as Sabre With Windows from a functional viewpoint.

  One of the important optional features with this product is graphical ticketing. Graphical ticketing addresses the minefield of complexities surrounding the automatic printing of travel tickets for customers, whether they be for air, rail or ferry. Instead of the old set of one character commands required by Professional Sabre to drive out a ticket successfully, graphical ticketing presents the user with a virtual image of the actual ticket as it will be printed. The image is constructed from the information already keyed by the user, following the reservations process. The supporting software is also a lot more intelligent and works out for itself the likely contents of various fields that are to appear on the ticket. The travel-agency user can then view the ticket image on the screen, make any necessary adjustments and when it looks OK, release it for ticket printing. Because humans are more adept at understanding and manipulating images rather than text and numbers, graphical ticketing can reduce errors and accelerate booking procedures. With the increasing complexity of ticketing rules and procedures, graphical ticketing is therefore an extremely useful and productive feature of Sabre For Windows 95 (Fig. 4.11).

- **Planet Sabre** This product, which was launched in the USA during 1996, replaces Sabre With Windows, i.e. Microsoft Windows Version 3, and also Sabre For Windows 95. It is characterized by an attractive welcome page showing the 'travel planet', which also serves as a top level menu of functions (Fig. 4.12). Simply clicking on the appropriate image shown of the travel planet will link the user to the associated set of Sabre functions. Planet Sabre was launched in Europe in two phases during 1997:
  - *Phase 1* This focused on two key areas: (a) formatting all non-air commands using a new GUI, and (b) incorporating the graphical ticketing sub-system. The reason for the emphasis on these two areas for Phase 1 was that they represent the areas where most errors are made by users. These are the kind of errors that arise from the occasional use of complex functions *vis-à-vis* commonly used simple 'bread and butter' functions, e.g. airline availability and reservations.
  - *Phase 2* This includes the automatic formatting of air booking functions. In essence, this replaces the use of a single character code with selectable menu options for all booking functions.

  Planet Sabre uses a full-screen GUI within a Windows 95 operating environment. It has a toolbar situated at the top of the screen that scrolls horizontally. The body of the screen

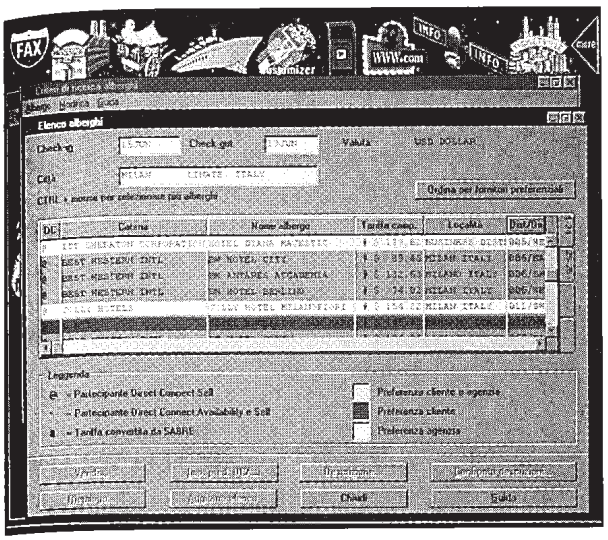

Figure 4.13 Planet Sabre (screen 1)

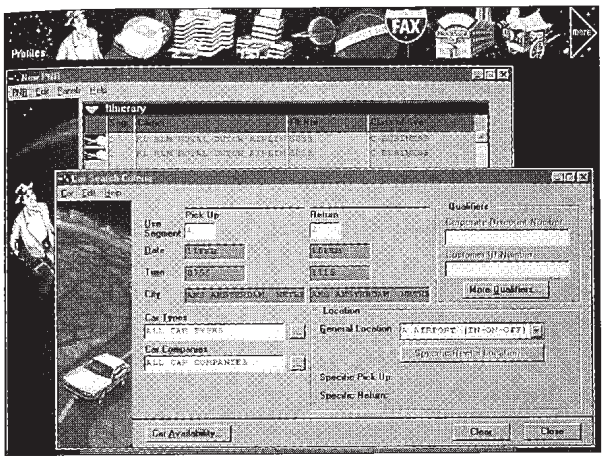

Figure 4.14 Planet Sabre (screen 2)

(Fig. 4.13) shows Sabre options and drop-down menus, all of which are selected by point and click commands using the PC mouse. All user initiated entries are cross-referenced and checked for validity prior to being sent to the Sabre host. Many entries are automatically generated using intelligent retrieval of contextual information, e.g. by using STARS, by using previously entered data and by populating hotel booking fields from basic air data already entered. Finally, Planet Sabre includes an improved version of graphical ticketing as a standard feature of the product (for a fuller description of graphical ticketing, see under Sabre for Windows above).

Besides all this, Internet access is fully supported along with a web browser (see Chapter 5 for more details of Sabre's Internet site – Travelocity). Planet Sabre requires a PC with a Pentium processor chip, a CD-ROM device and Windows 95.

- **Turbo Sabre** This is a Microsoft Windows product, which was launched in early 1996 and designed specifically for the high volume business travel agency. Its focus is on travel agent sales staff who need to achieve high levels of productivity in all business travel products. Thus, the design of Turbo Sabre is based on providing functions that maximize the speed of booking.

  It comprises a window that is sub-divided into four mini Sabre displays. The lower right-hand quarter contains 16 Windows push buttons that represent the 16 most commonly used Sabre commands. Each push button is associated with a key on the keyboard. The keys are arranged so that the ones that are easiest to hit are the ones associated with the most frequently used commands. When a key is depressed, the window in the lower right-hand quarter shows the next lowest level of commands. This process may be repeated until eventually, once the lowest level is reached, the screen shows either: (a) the actual booking data that must be keyed, or (b) the relevant display as requested in one of the other free quarters of the screen.

  The main advantages of Turbo Sabre are: (i) the speed of operation; (ii) the reduced amount of training time required for a user to become proficient; and (iii) the display of a large amount of information on a single screen, e.g. an availability display in the top right-hand quarter, a customer's STARS display in the top left quarter and a hotel availability display in the lower left quarter. Using Turbo Sabre, training time can be reduced from the one week required for most Windows products to just two days. However, users nevertheless still need basic training in the airline business.

  Newer and faster versions of Turbo Sabre continue to be released. The latest version supports the re-display of the last 20 entries

and provides more sophisticated customization features. This means that users are almost totally insulated from the cryptic CRS formats that are so difficult to learn and remember. This has been found to reduce the number of keystrokes required to create a PNR by 50 per cent thus reducing overall booking time by 25 per cent. It simultaneously reduces errors by between 20 and 50 per cent, while increasing preferred vendor sales by 20 per cent.

- **Sabre EDI Gateway** This product has been designed for those very large travel agents who have developed their own sophisticated in-house computer systems and branch network. Such agencies already have their own dedicated links to certain supplier systems that they then distribute from their head-office computer centre to their own terminal devices used in remote branches by means of a proprietary telecommunications network. Rather than have a variety of different interface programs (one for each large travel agency), Sabre has instead chosen to make its interface available using the world-wide standard known as Electronic Data Interchange (EDI). This approach has several benefits: (a) it is a computer-to-computer standard that is supported globally, (b) it means that Sabre need only maintain and support a single interface program for all such travel agency links, and (c) travel agents wishing to interconnect in this way can become readily familiar with the interconnection method. An example of one such large travel agency group that has connected its central system to Sabre is Club Med.

Corporates

Sabre has developed a set of end-user products that are specifically designed for large companies that have a high number of staff who fall into the category of frequent business travellers. This sector of the travel market, i.e. business travel, has its own particular requirements. For instance: (a) the travellers are usually individuals who are very knowledgeable in the field of travel, and (b) the companies usually have well defined travel policies that are carefully monitored by dedicated staff. Sabre has developed some relatively new and sophisticated products for this niche market:

- **Commercial Sabre** This is designed for use by corporate customers themselves. It is a product that has been around for at least four years, but has only a limited future because it will soon be replaced by Business Travel Solutions (BTS, see below). Despite its direct use by customers, it doesn't cut the travel agent out of the action at all. The way it works is generally as follows. The corporate customer (or business house account), uses a PC to access a sub-set of Sabre, i.e. a restricted set of Sabre's functions. The PC is connected to Sabre via a publicly available dial-up computer network called 'Compuserve'. The users of Commercial Sabre can request an availability display and select seats on flights that they wish to be booked. The bookings are then routed to the travel agent by the Sabre main-frame. The travel agent uses a dedicated reservations processor PC installed in the agency and supplied by Sabre to: (a) perform a quality control check on the bookings, (b) enter the more technical details into the PNRs, (c) make the necessary entries for ticketing, (d) check with the customers' established travel policies, and finally (e) confirm the bookings. Once the travel agent has confirmed the bookings, copies of the itineraries are sent to the customers' administrative offices and tickets are printed for the travellers. It is even possible to use Satellite Ticket Printing actually to print the ticket in the corporate customers' own offices, all under the control of the travel agent.
- **SabreExpress Fax** This is a product available under DOS or Windows and is now incorporated within BTS (see below). Roll-out started in 1993 on a global basis and was available to anyone who wished to have an airline reservations capability of their own. Like EasySabre, the corporate traveller completes a simple screen on their PC that specifies the booking required. The difference with SabreExpress Fax is that the booking is sent to a local travel agent via a fax board installed in the PC. (A fax board is a printed circuit board that contains a fax modem and is installed in one of the PC's expansion slots inside the case; it usually has some special communications software associated with it that runs in the PC itself.)

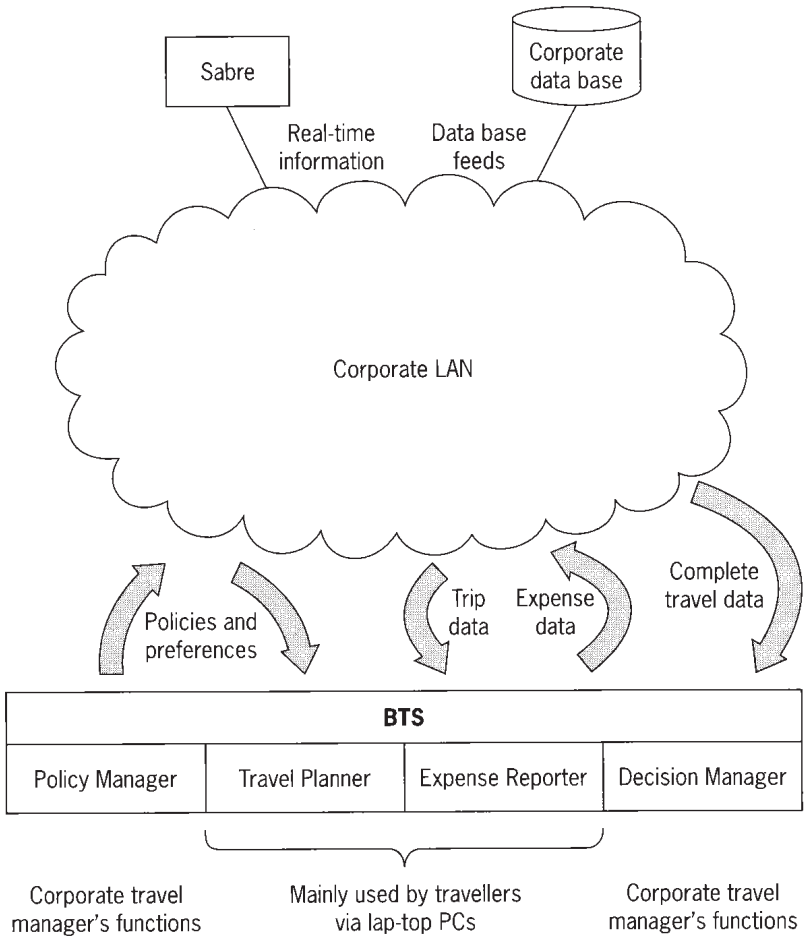

Figure 4.15 Sabre BTS

The travel agent receives the fax message and checks the booking adding any necessary fields before confirmation and ticketing.

- **SabreExpress Mail** Again this is a product available under DOS or Windows and its functions are now incorporated within BTS (see below). It is identical to SabreExpress Fax except that instead of using the fax service, an electronic mail service is used to deliver the booking request to the travel agent.
- **Business Travel Solutions (BTS)** This is one of Sabre's new products that is still in the development stage (the product was in Beta testing during 1997). It replaces SabreExpress and is designed for the corporate travel environment. BTS (Fig. 4.15) is a family of PC software packages that supports: (i) travel planning, (ii) expense management, and (iii) travel management functions. It is a product that is generally sold to large companies by Sabre itself as well as travel agents and other airlines who have an established business relationship with one of their large business travel customers.

  BTS is used principally by corporate travellers who often implement the software on their lap-tops and take it with them when they travel on business. It is also implemented on the company's own network of PCs, which are invariably linked by a LAN. The products are as follows:

  – *Travel Planner* This software provides access to Sabre for real-time bookings and the BTS core for administration. It runs on the traveller's own lap-top computer and accesses the Sabre network via a dial-up telecommunications link. It allows the traveller to view the availability of all travel products and services supported by the system.

Travellers can book airline seats and other products according to their own pre-set preferences and within the context of their companiest travel policies. Frequent trips can be stored as a template, which is then used to create a new trip of the same type. This accelerates the booking process considerably. Travel Planner also incorporates other easy-to-use features such as 'drag and book' – the appropriate icon is simply dragged across the screen and placed on the correct date in the graphical calendar.

- *Policy Manager* The company's travel policy is pre-programmed into the Travel Planning module. In this context, the policy is expressed as a set of rules governing such options as the class of travel, suppliers to be used, routes flown for certain destinations, category of room, type of car to be rented and other major factors that influence the cost of travel. Although the software can detect bookings that contravene the company's travel policy, it nevertheless allows the traveller to override the warning and make a booking outside policy. However, such bookings are flagged for eventual reporting to the corporate travel manager on an exception basis.
- *Expense Reporter* As expenses are incurred by the traveller they are logged and categorized by BTS. Some expense items are recorded automatically as a by-product of the booking process. Others are keyed by the traveller as they are incurred during a trip. At any point in time, the traveller may use their lap-top to view the expenses recorded to-date. Once the trip has been completed, the Expense Management sub-system provides the traveller with an electronic trip expense exhibit as a screen image that can be viewed, amended and eventually finalized before being electronically submitted for approval by a corporate executive. Although physical documentary supports, i.e. receipts, are required for some categories of expense, BTS comes as close as possible to a paper free expense management system – something most business travellers dream about!
- *Decision Manager* This is the software used at the company's headquarters to centrally monitor actual and planned travel expenses for all employees. As previously mentioned it produces exception reports highlighting instances where the company's travel policy has been contravened and keeps records of travel expenditure by various categories. An important function provided by this feature of BTS is management information. This is available not simply via voluminous reports but by report generator software and enquiry tools that feature a user-friendly GUI. Decision Manager can help lower costs by improving negotiated rates, enhancing pre-trip authorizations and stream-lining policy compliance.

Consumers

For many years, Sabre has recognized the importance of supporting its customers directly, while at the same time protecting its main distribution channel – the travel agent. This is not as much of a balancing act as it might at first appear. While it is all well and good to provide customers with information that helps them to plan their itineraries, making a reservation firm and printing a ticket require specialized skills that only a travel agent can provide. The following products have all been designed to support consumers, yet maintain the travel agent's key role in the loop:

- **EasySabre** This is a product that has been available in the USA since 1985, although it is not marketed in Europe at present. It is a version of Sabre that runs on a consumer's own PC. A modem is required to access Sabre via on-line services such as the Compuserve network and a simple 'fill in the blanks' screen is used to capture the travel requirements. Once this is captured by Sabre, the reservation is channelled via a local travel agency for ticketing and follow-up action. The user does not need to be familiar with the Sabre reservations language.
- **Travelocity** This is Sabre's Internet product offering and it is described in more detail in Chapter 5 – The Internet.

Finally, Sabre supports electronic ticketing (see Chapter 3 for a fuller description of electronic ticketing). This is currently in widespread use by