Airline development of in-house reservation systems is a cost component that can be removed. By selecting an external vendor, airlines reduce cost and secure greater functionality than they can develop by themselves. This comes via ease of use and superior customer management.

Reservation systems development & third party providers

With the need for carriers to seek efficiency in all areas of operation, transferring the passenger reservation platform to a third party is an effective strategy. To benefit from this decision airlines need a thorough understanding of the underlying principles.

The computer reservation system (CRS) is the cornerstone of an airline's IT structure. The system holds, displays, and processes passenger reservations, as well as operational data. Historically, these systems were focussed purely on reservation and inventory, with additional functionality bolted on. Newer systems are often referred to as passenger service systems (PSS), because they redefine the focus of the system by responding to the individual needs of passengers.

A problem airlines face when updating an existing CRS is the old technology base on which the systems are built. Integrating new technology with 1970s' architecture is a challenge, resulting in airlines deciding to replace rather than update.

Replacing a CRS is a logistical challenge presenting airlines with the need to evaluate the investment required against the process improvements offered. Start-up and low-cost airlines require a different type of system, that covers all areas of operation, from reservations to revenue accounting, in a turn-key package. However, as these airlines grow, their existing system, designed for smaller operations, may be unable to keep pace. What are the options available to airlines for replacement, and what are the major issues that have to be addressed?

Functions of the CRS

CRSs were designed to automate booking and reservation procedures, with most medium to large airlines designing their own. Constant evolution and operating requirements contributed to system development. All airline functions are linked to the CRS, including pricing, reservation, ticketing, frequent flier data, flight processing and departure control.

British Airways (BA) is one airline that has faced the complexity inherent in replacing a CRS. During migration from BABS to Amadeus, BA identified over 200 downstream systems that would use the Amadeus PSS as a data source. Hans Jorgensen, vice president at Amadeus explains: "The airline's existing CRS is not switched off, it just becomes dormant. The new PSS replaces the functions of the old system. However, identifying all the areas that the PSS touches is critical. Replacing an existing platform has an impact on all operational areas, from dispatch and catering to how many newspapers are required on board and in which languages. PSS is designed to manage passenger relationships; the systems will always have complexity."

A major function of the CRS is to store and process the passenger booking as it progresses from enquiry, reservation, check-in, travel, and hand-back (where the reservation is archived and later audited through the revenue accounting process). This whole process is transactional-based and relies on process oriented functions.

Many new processes are being incorporated to ensure the airline/passenger relationship is managed; part of the customer relationship management (CRM) chain that all service industries deem as critical. These processes include customer recognition and preference information, frequent flier, special meals, and identification of travelling companions to ensure people travelling together are seated together.

Additional requirements include storing schedules, pricing information, fare rules, telex messaging and flight information. Airlines can benefit most from PSSs in handling CRM. "The basic functions of reservation systems are the same. They are commodity transactions that deal with the reservation process of a passenger: taking the booking, reducing the inventory, and eventually performing check-in," says Jorgensen. "Every system performs the same basic function. Airlines are looking more toward customer management, and developing systems that manage the relationship with the customer. It is those tailor-made systems that are unique."

As airlines invest more money into CRM to yield the benefits that effective management of a loyal customer delivers, existing systems are being stretched to their limit. Hugh Pride, director of IT for the Emirates Group and head of Mercator explains: "We see CRM as a step-by-step process, where identification of customer needs is driven by where you are in the sales process. Passengers are definitely customers, but taking a broader and comprehensive view, so too are travel agents, consolidators, and everyone else involved in the sales process. Generally, existing systems struggle with the

Processes are now being incorporated into reservation systems to ensure customer relationship managed. These include customer recognition, frequent flier information and special meals. Other airline requirements are storing schedules, pricing information, fare rules, telex messages and flight information.

relationship complexity between supplier and customer, resulting in loss of revenue. Traditional systems were designed around controlling seats and inventory. New systems must be designed around customer needs and seamless CRM."

With many systems based on platforms that were created in the 1960s and 1970s, the need for newer systems is influenced by the increased complexity that airlines assume in managing passenger information. Airlines often seek replacement of their existing system as a realistic alternative to in-house upgrades, since these can be expensive.

System replacement

An airline should examine several key issues before deciding to replace its reservation system. These include the benefit of moving to a new system, the usability that is gained or lost, and the benefit of removing significant IT cost.

Many carriers have evaluated their reservation system options, while Royal Brunei, BA, Qantas, and Air Jamaica have all recently moved to third party providers. South African Airways may also be a replacement candidate, since it moved from its native Safari system to the Swissair/Atraxis platform, shortly before that carrier's collapse and Atraxis' purchase by EDS.

About 40 airlines have recently moved to Amadeus, among them Qantas, BA, JAT Yugoslav Airlines, and Qatar Airways. Royal Brunei, Pakistan and Air Jamaica moved to Sabre. Volare moved to SITA's Gabriel, while Sri Lankan and Air Algerie joined Emirates at Mercator. The decision to move can be difficult, but the benefits often outweigh the risks.

"Reservation systems are highly complex, and airlines can continue to upgrade their native systems as the research and development (R&D) required produces ever increasing cost," explains Emre Serpen, vice president of Sabre Consulting. "Moving to a third party supplier allows them to access a greater knowledge pool, where the vendor can undertake continuous R&D because they have a broader client base and are able to spread the investment required over a large number of clients. Individual airlines cannot keep up with this investment, and their in-house systems will be increasingly disadvantaged."

Development of CRS technology to meet the increased demands of e-commerce opportunities and CRM needs is a key component in the decision of carriers to move to a third-party system. "If airlines try to support their native systems they often compromise functionality due to their limited R&D. Most changes are often fault patches rather than actual functionality upgrades," says Serpen. "This reduces the effectiveness of their system compared to a competitor, which may be on a different platform. This disadvantages the carrier while adding cost to the airline's IT structure."

An airline must consider its strategy and needs when considering a shift to a new platform. Replacing a native system with a third-party system removes significant cost to the airline. The reservation system itself is only part of the requirement driving replacement. CRM, e-commerce, revenue management, pricing, departure management, and flight editing must all be included in any evaluation exercise.

System replacement requires a considerable investment by the airline, and the airline must ensure that any system offers as many functions and solution channels as possible. Scalability, where systems and solutions are tailored to individual airline requirements, is one incentive. Airlines also benefit from ongoing product development at a cost less than that required from an individual airline, as development cost is distributed equally among all users.

New generation products

Third party providers are developing further systems that utilise younger IT platforms. These systems are often referred to as New Generation. Proposals for new generation systems include open-architecture methods which provide more transparency in the booking process and are easier to integrate with other carriers. This is particularly important for carriers considering Alliance or code-sharing agreements.

Allying carriers often experience difficulty in system compatibility, restricting the ability of a carrier to interline passengers, capture marketing data, and sell on the other airline. The need to have effective integration is vital, otherwise airlines can lose significant revenue. "System integration is a vital component of any airline's IT strategy. Poor integration can be harmful to an airline and can hurt the potential profitability of any alliance," says Pride. "New Generation will resolve this to some degree, dependent on the platform types selected. Reservation systems are highly complex, and reliability is vital. Currently only mainframes offer this

British Airways is one of 40 airlines that has moved to Amadeus from its own reservation system in the past 24 months. Others have similarly moved to third party suppliers, including SITA and Mercator.

stability, but we are investigating other options. The initiative to develop new generation systems has partly been fuelled by the growth of Emirates, and partly the demands of other customer airlines. New Generation is the development path for reservation systems." Few airlines will develop their own system due to the high level of resources that this demands.

Amadeus is well advanced with its new generation IT platform. The final parts of the inventory system will be finished in June, after which user acceptance testing begins. Qantas will be the launch customer, with programme launch set for 2004. BA will follow after.

Departure Control system delivery in 2004 will mark the final phase of the Amadeus NewGen project.

SITA is also pursuing new generation systems, and has just launched a partnership programme with Unisys. The system will be browser-based, and use advanced protocols to link with existing IT architecture. SITA will be rolling out departure control (DCS), pricing and inventory systems this year, with complete rollout to all customer airlines by 2005. SITA has 160 airlines that use its IT systems, which is a significant base to attract new customers to the first new generation platform made commercially available. "Along with our partner Unisys, we will be offering new generation systems by year end. We will be rolling out DCS and inventory this year," says Bob Thorpe, vice president of passenger services at SITA. "This will allow an airline to secure the benefits that new generation brings to the passenger process, and will allow SITA to leverage its IT neutral position. Our systems are used by many airlines, and we integrate with existing IT platforms. With our new products this will enhance the support solutions that we can offer an airline. We will offer an evolutionary route, where the customer database and inventory is available shortly, with other systems following. Significant resources are being placed into the programme, and the additional functionality and CRM benefits that can be sourced by an airline are considerable." These developments place further pressure on existing systems, as the improved usability and service levels of new generation systems will redefine the market.

Inventory

At a basic level, a reservation system is designed to display the seats available for sale, and record the transactions that occur. The inventory keeps a record of the number of seats available on a flight, and the number sold and unsold seats. This information is stored by booking class. Some PSSs do not hold these data, and are hosted in a separate system or by a third party, with the PSS making the link.

Lufthansa Systems acts as the inventory host for many Amadeus System Users, and is the preferred partner for Amadeus. "We have developed systems that complement each other. Reservation processes are unique to each carrier and we have developed a platform where functionality and reliability can be combined with individual airline needs," says Gero von Goetz, vice president. strategic business segment passenger and sales service at Lufthansa Systems. "This revolves around Amadeus' industry unique System User option, an option that 131 customer airlines employ."

System User is where a carrier receives global distribution system (GDS) functionality for its own direct sales, while maintaining the lower costs associated with a direct booking channel. "System User is a development which allows an airline to access all the benefits of a GDS, while securing lower booking costs associated with direct sale," explains Jorgensen. "An airline uses Amadeus as its sales and reservation system in its airport and travel offices. This gives the airline access to a wide range of travel information, allowing it to also book services from hotels and rental cars. The airline also benefits from the constant enhancements to the system."

A significant issue when selecting an inventory host is the method employed for updating the availability displayed in the GDS, and whether it accurately reflects the true availability listed in an inventory system. Often errors occur if an airline does not use dynamic availability and relies on availability status (AVS**)** availability. Dynamic availability immediately updates displays when a reservation is made, showing real-time availability. AVS availability relies on AVS messaging to update displays, resulting in a delayed response. This sometimes results in displays showing available seats that no longer exist, or no seats when seats are available. The cause for this is partly in the messaging system. If less than five seats are available in a class, it will be shown as closed; no more bookings may be made despite seats being available. If five seats are available the system will often show the class open for sale with nine seats, since that is its default setting.

To maximise selling opportunities, and to reduce the risk of oversale within booking classes, airlines should consider using dynamic availability to link their reservation system to their inventory.

"The selection of dynamic availability is often driven by the regional market conditions that a carrier experiences, as booking demand varies. Permanent optimisation has to be weighed against the cost saving of AVS. If your markets do not require constant optimisation then dynamic availability may not be required," says von Goetz. "Additionally, some GDSs are technically incapable of supporting dynamic availability, which drives the decision process."

Some markets, such as Scandinavia, receive 80% of all bookings within a

Low-cost and start-up airlines seek a different approach to reservations than major carriers. Low-cost airlines do not need to manage customer relationships, and so seek systems that will manage reservations, pricing, revenue management and revenue accounting. These systems may have to be upgraded as their passenger volumes grow to larger numbers.

week prior to departure, while the German market receives 70% of all bookings 2-3 weeks in advance. Depending on the markets in which a carrier competes, AVS is a more cost-efficient option if booking demand is not heavily concentrated.

Cost efficiencies

The investment required to change from an existing system to a third-party system is significant, although the cost savings make it a realistic option. Direct distribution channels are favoured by airlines, with many exploring strategies to capture a greater share of reservations.

Sabre has recently increased its booking charge by an average of three per cent, resulting in airlines seeking technology to bypass the GDS systems. American Airlines sells over $5 billion a year through Sabre.

Over the past six years booking fees have risen by 28-40%. A direct booking costs about 70 US cents, while a travel agency booking costs $3.50. Depending on the GDS, the booking charge can be 3-5 times higher than a direct booking. However, to enhance direct distribution and attract customers, airlines usually sacrifice yield. Thus the savings could become counter-productive, as seen in the US market. US Airlines, in an attempt to secure additional bookings, offer deeply discounted fares available only on the airline's internet site, or an airline controlled site. This reduces GDS charges, but requires deep discounting, resulting in a neutral or even negative revenue return when compared to a GDS.

Airlines are constantly seeking methods to reduce booking fees, and encouraging direct selling is common. Many US carriers offer heavily discounted web-only fares, in an effort to remove high-cost distribution channels. A third-party PSS incurs a per-passenger cost. This has always been present, even with in-house systems, but was often concealed within the IT cost structure.

Generally, PSS suppliers are willing to discuss innovative pricing options with customers. "We usually charge the airline based on passengers boarded, which allows all costs to be transferred onto a variable basis," says Thorpe. "As passenger volumes increase so does the overall cost to the airline, but if passengers decrease then so do the costs. This allows airlines increased flexibility, and removes the burden of high fixed-cost structures that many have to contend with. We are innovative in our pricing structure, since this is an area important to airlines." While reducing fixed costs, airlines are also able to secure economies of scale when more customers invest in product development.

Airlines are also able to remove significant amounts of IT cost, because they no longer have to invest in R&D. The R&D investment is absorbed by the supplier, with the cost distributed among all users. Airlines also benefit from tailored pricing options, where many PSS vendors charge based on emplanements. "Moving to a third party moves fixed cost to variable cost. Airlines were previously responsible for maintaining an IT department, and developing their in-house system. This fixed cost cannot be avoided," says Jorgensen. "Amadeus charges the user on total passengers boarded, which is a variable cost, and there is an immediate saving. Airlines seek to lower costs by moving to a third party vendor like Amadeus. Because it is a GDS it allows them not only to lower their IT infrastructure costs, but also their distribution costs as well. It is a double benefit, with which they can gain considerable efficiencies."

Low-cost options

Start-up and low-cost carriers seek a different approach to passenger reservations. These carriers have no requirement to manage passenger relationships, and therefore seek systems that will perform the basic transactions of a reservation system, as well as the revenue management, pricing, and revenue accounting functions.

Navitaire's OpenSkies product is the leader in the low-cost segment, having a virtual monopoly on low-cost airlines. Ryanair, Virgin Express, Virgin Blue, Jet Blue, and AirTran all use its product. Major carriers that have launched a low-cost arm (British Midland and BMI Baby, Air New Zealand and Freedom Air, and British Airways and Go) also elected to use this platform, rather than their existing system. Part of the appeal is driven by cost. OpenSkies offers a considerable saving per booking segment charge when compared to the larger systems.

The appeal of system integration, where Navitaire offers the entire reservation, RM, pricing, and accounting package as an integrated product is a major factor in its continued popularity. It is a turn-key operation.

The existing platform may be limited, since the architecture was built around smaller business models, but as fleet size has increased the system has been able to keep pace. Potentially, the systems employed by the low-cost carriers will have to be upgraded or replaced if their fleets grow to more than the 300 aircraft.

SITA is an existing supplier that could secure a greater level of future low-cost airline clients. With its new generation system soon to be launched, and an existing client base of smaller airlines, SITA already meets the needs of start-up carriers. SITA currently has 40% of tier-four carriers (up to 3 million passengers), and are gaining a sizeable market share in tier-three carriers (between three and 10 million passengers). These carriers often adapt their market strategies to become low-cost airlines.

Virgin Express is one of many low-cost carriers that has used Navitaire's OpenSkies product. The major appeal of this system is a low cost per booking compared to larger systems.

"Tier three and four carriers grow, and move up the levels as their networks expand. SITA offers systems that can keep pace with the growth demands of these carriers," says Thorpe. "Tier three carriers, like Virgin Atlantic, will continue to increase their passenger volumes and carriers that are our customers will push SITA's presence to the upper areas of that group. The products that we are now rolling out to the market provide carriers with the opportunity to develop effective CRM, and to benefit from the enhancements that New Generation offers to users. The systems are scalable, and are able to meet the demands of any airline."

New market entrants

While Navitaire currently enjoys a dominant market position with low-cost airlines, several companies are evaluating the options for offering solutions to this market segment. "Amadeus is interested in building a system that meets the needs of this market group. This market has different architecture requirements and business process requirements to traditional carriers," says Jorgensen. "The low-cost airline market does not have the need for sophistication and complexity. Instead a new system has to be created to meet their needs. You cannot simply downgrade an existing PSS."

Other systems are also being offered to compete with Navitaire: SITA, Lufthansa Systems, and Sabre are all offering solution packages tailored to this market.

"The systems we offer include different modules tailored to the needs of the carrier. The base package is upgraded to meet the increasing IT demands as size and complexity increases," says von Goetz. "Scalability in any system is important, because low-cost airlines need systems that can keep pace with growth. A modular system is the best approach because it allows different modules to match the airlines' needs."

The modular approach is also employed by Sabre, which sees value in building systems that closely match airline needs. "With low-cost carriers, airlines start small and grow fast so scalability is important," says Serpen. "Low-cost airlines do not want a reservation system. They want an end-to-end solution that is combined as a total solution; a bundle concept."

User screens and ease of operation are other areas where low-cost carriers seek to reduce complexity. Traditional systems require complicated command prompts to be entered. New systems use a browser system that is more intuitive to the user and reduces required training time. This is important if there is a high turnover of staff in areas like telephone sales.

Lufthansa Systems have developed a new graphical user interface (GUI) that complements its CRS. It is also attachable to an existing system; enhancing existing functionality with its graphics system. This has been developed for Lufthansa and is focused on process, rather than transaction oriented functions.

SITA is also developing a browser influenced GUI for their new-generation system. The SITA GUI can also be applied to the screens of existing systems, increasing the functionality for current users. Both systems are designed to allow the user easy navigation, provide ease of use, and allow the airline to save training costs. As more companies begin to offer new generation systems, browser-based systems will become standard, replacing the existing command prompt screens.

Summary

Established and start-up airlines have different requirements when it comes to selecting a CRS. Established airlines seek a system that can meet their increasing demands for CRM, as well as removing from the airline the need to invest in IT development. They want a system that can communicate with their own existing suite of IT systems, and provide a seamless link between them.

Amadeus is often identified as having the best IT architecture, partly contributing to their success as a leading PSS supplier. Many carriers are evaluating their options for system replacement, and more will be migrating away from their in-house system towards a dedicated system offered by a third party.

Similarly, low cost and start-up carriers do not want to invest in IT development, or purchase several systems and then link them together. They are seeking a comprehensive system that will cover all their needs. OpenSkies currently offers this. It will face increasing competition, however, as the market develops. Suppliers are offering greater product development, and at a lower cost, than airlines can provide internally.

More airlines will therefore move from their own systems towards a newer PSS, securing cost and functionality benefits. The development of new generation systems, led by Amadeus and SITA, will further focus the market in this direction.

Those airlines serious about CRM and passenger service will seek the benefits that these systems offer, placing pressure on other vendors to match.

Mercator is seriously examining its strategy for new generation systems and, given its track record for innovation, could emerge as a key player in the future. As more new generation PSSs become available, the existing transaction-based systems owned by individual airlines will become increasingly obsolete, and pressure to replace them with third-party vendors will increase. Airlines will be able to make significant savings, both in R&D and IT expenditure, thereby enabling them to focus on their core business. AC