In the current operating environment, airlines place greater reliance on IT systems to remain competitive. Integrating compatible IT systems can return benefit to an airline providing it is done correctly and important areas are addressed.

Cost reductions and efficiency gains from IT integration

Cost efficiency was not a high priority before 2000, since airlines were able to gain more leverage from increased passenger revenues. Now airlines need to reduce their operating costs, and outsourcing and integrating IT systems is one area where they can make savings. Many IT providers are experiencing their busiest trading with airlines, at a time when the industry is suffering the most.

Many IT systems are designed around a standalone process: scheduling has a system that suits its needs, crewing has its own system, while accounting and engineering also have their systems. Integration allows airline departments to better share data; improving decision making, reducing revenue wastage, and increasing operational efficiency; as well as reducing costs. Modules can also be added to existing systems to enhance performance.

Systems integration

Evaluating the benefit of IT integration is a preferred option. "System integration requires the single definition of a data element across the entire airline, and the sourcing of that data element from a single area by several systems," says Hugh Pride, director of IT for the Emirates Group. "Data redundancy and replication are two cost reduction areas for an airline. This is because multiple systems host the same data. Each system must be maintained, replicating cost, and increases complexity and raises the chance of data error. Keeping data synchronised is also very expensive. Integrating systems is therefore vital, both from a cost and efficiency perspective. Integration is not an easy process, and many airlines struggle with the complexities. The returns, however, can be significant."

Integrated systems combine multiple data sources and provide the user with detailed information. This provides, for example, the ability to match maintenance records or fuel consumption with aircraft registration, and then link this to the scheduling system. Matching fuel efficiency of aircraft to the operation provides a more accurate picture of operating costs on each route.

Airlines can secure the benefits of a better understanding of their cost base. "Airlines have cost bases they need to track. For example, 5-20% of passenger revenues can be consumed in distribution alone, with administration costs accounting for another 10-12% of revenue," says Dave Brown, senior director of business management and strategy at SITA. "When operating and security costs are added to the mix you can see the pressure airlines are under. Integrating solutions allows airlines to focus on areas of inefficiencies. They can highlight areas where they were unaware of problems. This requires information across crewing, cargo, reservations, flight operations and maintenance to be linked, and the data then analysed on a real-time basis. It requires an investment in business processes to get to this level, because the IT systems need to feed into a common source. An airline will benefit if it pursues integration."

Integrating systems is challenging. "Most airlines seek integration at some level. Due to their varied maturity levels they have different requirements," says Jürgen Thomas, director of technology centre schedule & reservations at Lufthansa Systems. "All airlines have heavy cost pressures, and IT integration is one area where they can relieve some of that pressure. If short term gains are required, an airline should take simple steps to improve its efficiency. Assessing the return on investment from integration for every phase of the project is vital, to ensure maximum return is made."

There are many options for integrating systems. An airline may invest in areas that provide limited return, but there are key areas of benefit.

Data

The capture, management and analysis of various data sources define integration. This is generally performed by third parties, since airlines often lack the resources to develop systems. Airlines can transfer fixed costs to third party providers.

British Midland (BMI) has outsourced its IT to Newburn Consulting. Newburn has assumed responsibility for BMI's Internet Protocols, local area network (LAN), and wide area network (WAN). "We now manage the voice/data network for BMI. By combining and improving BMI's processes we reduced its costs by $1.9 million (£1.2 million) in the first year, and a further $2.2 million (£1.4 million) in the second year," says David Brown, partner at Newburn Consulting. "We expect to provide further cost efficiencies as BMI's IT network is developed and integrated. Network efficiency and infrastructure development is an area that many people ignore, where airlines can make savings for a low investment. The next logical development is better management of the desktop infrastructure and IT support systems. This produces a reliable system that solves client needs, but this area receives limited attention although the cost savings can be significant. Savings are gained from reduced overheads and reduced need for expensive speciality skills."

Data sources need to be managed to ensure it is not stored and maintained in several systems. Data is stored in a single

An example of the benefits of systems integration is the matching of maintenance or fuel consumption records with aircraft registration and the operations schedule. This then provides airlines with an accurate picture of the operating costs on each of their routes. All an airline's cost bases can be tracked.

depository, and airlines are already doing this by linking processes to their reservation systems. This can be reflected in many ways. "One benefit for an airline is data integrity. When you have reservation and departure, scheduling and flight operations systems all working off different databases the information may be contradictory," explains Vinay Dube, vice president airline solutions for Sabre. "An example of data integrity can be seen with schedules in the day-of-operation environment. A customer can be told by check-in that their flight is cancelled, because check-in sees the information from operations. If the customer contacts the airline's reservations department, however, it will read from a different schedule feed and see that the flight is on-time. Data integrity prevents this."

Improving the storage and retrieval processes can improve efficiency if data is not stored in multiple locations, because each location accrues maintenance costs.

Commercial operations

IT providers offer integrated systems that can provide benefit for a relatively small investment. An example of the integration solutions being offered is SITA's Profecy system which integrates multiple data sources to examine revenue performance on individual flights.

"Multiple data sources are combined to determine where revenue leakage occurs. Revenue leakage can happen for an airline in many areas, either through missed connections, flight cancellations, or a myriad of other areas where revenue can be lost," says Brown of SITA. "Airlines focus on capturing revenue, but little effort is made to determine how much leaks back out again. We have developed Profecy to enable airlines to manage passenger cost exposure and identify causes of revenue wastage. Systems like these are complex, because no two airlines requirements are identical. There are large volumes of data, with information being collected from pricing, revenue management, inventory, reservations, scheduling, crewing and every other functional area. Obtaining the required data can be difficult because data sources need to be integrated. Airlines often host incompatible platforms, so it is vital that merger systems are IT neutral."

Sabre Solutions provides a similar process of focusing attention on lost revenue within both its AirFlite and AirOps systems. Management and control of flight operation complexities require integration of multiple data sources. Thomas says: "Merging scheduling and operations data is a logical development for airlines. When a schedule disruption occurs, operations staff make decisions based on regaining schedule integrity. They may do this by cancelling flights with poor loads to minimise passenger disruption. While this may work on an operational level, it often does not factor the actual cost of flight cancellation, or the knock-on effect that may occur. To determine the cost and optimal overall network solution, it is important to have processes that examine the network complexities on a real-time basis. This requires sophisticated data merging to provide accurate analysis of these complex issues."

Decision complexity is vast, and increased information availability improves decision making. "It is important for scheduling and day-of-operation staff to have as much information as possible," says Dube. "However, it must be single-source, because they do not have time to examine different systems. They need to develop alternative scenarios that consider revenue impact and customer issues, while minimising passenger and schedule disruptions, and this is not easy. With all the relevant information, they can make a decision to minimise the overall revenue impact. That requires a system that allows them to see the knock-on effects their decisions have. As an example, operations often ignore the option of using ferry flights to position aircraft during disruptions, because they are unaware if it is a viable alternative to cancelling and re-accommodating passengers. Our systems are designed to help flight operations identify revenue options, risks, demand issues, and operating constraints. This enables operations to rescue a schedule, with the smallest economic impact. The need to account for aircraft positioning, maintenance requirements, crewing issues and passenger demands while seeking an economic solution in a time-pressure environment is close to impossible without support systems."

Passenger information

Another area for increasing efficiency is processing and handling of passenger name records (PNRs). "Airlines can benefit by screening for duplicate bookings at an early stage. Early cancellation of duplicate bookings or non-ticketed bookings returns benefit to the airline in two ways. It frees up inventory for re-sale, and it saves payment of reservation fees for each booking segment," says Thomas. "The process is complex because it needs to match the PNR data to pricing rules to determine if the ticketing rules render the booking invalid. The system also needs to examine ticketing numbers to ensure ticketed PNRs are not cancelled. Some airlines have their own proprietary system to perform checks, others perform checks manually using reservation staff to examine bookings. The cost of the staff often overrides any cost saving incurred.

IT systems integration can also be used to screen for duplicate passenger bookings. This frees inventory and saves on payment for reservation fees. This requires it to match PNR data to pricing rules to determine if the booking can be rendered invalid.

"For a system to work effectively several different IT systems and databases must be integrated. These are pricing, booking class rules, ticket information, revenue management and reservations," says Thomas. "We have defined business rules to deal with most scenarios. The data feeds ensure that valid reservations are not cancelled. A multi-host system, where the systems are neutral and can be run on any platform, is vital. It provides the flexibility to develop in tandem with an airline's increasing level of IT sophistication."

Correct management of passenger information aids passenger retention, which underpins customer relationship management (CRM). "With CRM there are many touch points where the passenger interacts with the airline. This includes reservations, departures and frequent flyer systems," says Pride. "Despite these areas of contact, there is often little integration. Passengers need to be dealt with on a real-time basis, and it is vital that systems transmit and process in an integrated fashion so that everyone has the same passenger information available. That is a level of integration that leads to customer service enhancement, and ultimately revenue enhancement."

Departure systems

Data sharing can enhance airlines' passenger security processes. "Airlines can benefit from integrating their departure systems to save security cost. The departure system is used for calculating weight and balance for aircraft, so linking it to the cargo and passenger systems makes sense. This allows the aircraft controllers to have more information about what to load on an aircraft, because they would have the ability to determine individual passenger and cargo consignment values," explains Brown at SITA. "That really helps the decision making process, because additional cargo may have more value than standby passengers."

Improved departure systems, with access to increased data volume, requires airlines to make their departure systems available at all airports. SITA is the leader in IT neutral airport systems, which generally involves their common use terminal emulator (CUTE). CUTE acts as the link between the airport environment and the airline's own reservation and departure system, allowing airlines to access their own systems. Integrating CUTE functionality into a reservation system is an invaluable step towards improving efficiency at airports. It can also be used to improve an airline's security procedures. "Value can be gained from having access to your native departure and reservation systems, especially for security processing. Advanced passenger processing (APP) involves checking each passport against the destination country's immigration database to ensure the passenger is allowed to disembark or transit. APP is tied to government systems, allowing the interrogation of government data to ensure visa requirements are followed. This increases security, since government agencies are aware of all arriving and departing passengers and provides security services with awareness of inbound passengers and how long outbound passengers have stayed. The use and distribution of this data may become more widespread, dependent on regulatory body demands. APP removes the risk of airline fines associated with deportation or visa violations. Qantas already uses it to great effect for all passengers flying to or transiting Australia. This makes the airline's security processes easier to manage."

Lowered costs

A major benefit of integrated IT systems is removal of staff and research and development costs. This occurs in two ways: outsourcing of systems, and by removing duplication of processes.

Most options for outsourcing are more attractive if several systems are moved to the same company, allowing the new IT host to secure economies of scale. British Airways (BA) secured this benefit when it moved its reservations, inventory, and departure systems to Amadeus.

This move allowed BA to shift fixed costs to variable costs, based on passengers boarded, securing a significant saving compared to its previous structure. "A lot of IT costs are masked because of the complexity of an airline," says Brown at SITA. "Outsourcing companies prefer to take several similar procedures and combine them to benefit from the efficiencies and economies."

Integrating systems can also remove the duplication of processes, an area of expense for an airline. Duplication, where the same process is repeated by several departments, occurs in many areas of an airline's IT structure. "Part of the integration process is that data are accessed from the same source, thereby removing duplication," says Dube. "It is important to use the same data sources. For example, 45 of our 75 systems have an airport table that provides information on individual airports. Instead of having 45 airport tables, they all reference just one. This removes the need for 45 individual tables to be maintained, updated and managed. This makes a considerable saving to the airline."

Limitations

To secure benefits, an airline must be willing to outsource non-core functions. A poor outsourcing strategy adds a

Data sharing can also enhance airlines' passenger security processes. This has the benefit of reducing security costs, as well as calculating weight and balance. It should then also be linked to the cargo and passenger systems to achieve full integration.

further cost layer, while properly executed integration can provide a significant return on investment. "Our approach is based on getting the basics correct. When dealing with integration you need to focus on two or three basic factors. One is cost, which has to be determined," says Pride. "Another factor is customer service. We always go through a business analysis with clients to determine the value of any project, where costs and benefits are analysed."

Conflicting IT systems

Airlines often purchase IT systems from different providers, resulting in non-harmonised systems. Unless systems are IT neutral, the ability to integrate them is limited. Modern IT systems are generally designed to link to other IT systems. Any IT system should employ general IT architecture rules. Sabre is assisting IATA in the development of airline industry standards.

"When determining needs, an airline must define between integration and interoperability. Integration occurs when systems are tightly grouped and are designed as a unit. Interoperability allows systems to be modular and operate with others. Generally, when airlines talk about integration they are really talking about interoperability, because they have not secured an end-to-end business system," says Dube. "Customers do not always purchase an entire suite of systems from one vendor, but from a range of vendors. To ensure that any system an airline purchases has value to other systems, the architecture that it is built on should be based on industry standard specifications. This allows systems to exchange data and work as interoperable components. Without this type of architecture, the system has no benefit beyond its intended function, and the return to the airline is limited. Prior to selecting any system, airlines should determine that their IT systems will be able to interact."

Control

Significant airline overhead and R&D costs can be removed, either with an in-house- or a vendor-based system. "Airlines can baulk at the prospect of losing control over their systems, but they soon see the benefit," says Thomas. "Airlines are in the business of transporting passengers, and using decision support tools to assist them. They are not in the business of developing IT solutions, it is not their core function. Several hundred airlines could each develop their own scheduling system, for example, with them all being similar, because they all have the same basic requirements. It is more cost efficient for airlines to purchase a tool from a vendor than to develop it themselves, thereby saving development costs, reducing overheads, and securing systems with greater levels of functionality."

Many airlines continue to develop and maintain their own IT systems. This hampers development, since R&D funding is not always available. Airlines resist a wholesale move of strategic areas to third-party vendors because it is viewed as a loss of control. Paradoxically, airlines have been willing to move their reservation systems to vendors, which are their most strategic and critical IT tool.

Summary

Airlines have many options when it comes to systems integration, and only a few have been examined. Airlines need to integrate systems that enable them to save cost or identify revenue opportunities.

Cost savings are achieved by reducing or eliminating maintenance and research costs, and removing areas of duplication. This can be achieved by merging various data-sources, controlling data management, and avoiding replicating data in several areas. By controlling data, airlines can benefit from improved system and data reliability while reducing costs.

Revenue benefit can be achieved by integrating several different systems to provide a greater decision support process, and provide greater information to users. By combining different systems in the scheduling, flight operations, maintenance, or reservations areas, airlines are able to improve their decision making and revenue earning potential. Additional savings can be made in security and passenger processing.

Airlines should consider the benefits that integration brings, and determine the benefit of future IT purchases on the basis of the integratability of a new system with existing systems. Airlines need to determine the potential benefit, secured through increased revenue or decreased cost, prior to integrating systems.

Identifying costs within an IT structure is very difficult, due to the inherent complexity of the systems. A leading IT provider estimates that carriers only identify 40-45% of their overall IT costs, the rest remaining hidden or accounted for in other areas. AC