Freight carriers have to accept the reality of declining yields. Some of the few ways to combat reducing operating margins is to employ software systems to improve cargo revenue management, and reduce the costs of handling freight consignments.

The benefits & failures of cargo revenue systems

With air freight business worldwide booming but yield declining, cargo airlines are attempting to reduce operating costs and increase revenue with the assistance of modern IT systems. The nature of the air freight business, however, means that their efforts cannot all generate positive outcomes. Operating costs can be squeezed, but revenue is fixed by contracts with shippers and forwarders. In which fields can the airlines maximise freight yields from the application of IT systems, and where do these technologies fail to deliver cost reductions for the cargo business?

Cost incentives

The cost savings specifically derived from air freight business mainly involve airway-bill and ground-handling labour costs. Airway bills, the documents that track the whole process of transporting cargo, and the staff required to handle the documents, have together become a significant operating cost. Research by Unisys shows that 40 steps are needed to finish transporting an air freight shipment with a traditional airway bill. The airway bill cost consequently accounts for 5-8% of the total operating costs for the air cargo industry.

Air freight is a labour-intensive industry, where traditionally a freight carrier requires five to eight employees to handle every 100 tons of freight, which makes the profit margin for the business quite narrow: usually no higher than 5%. Labour costs for ground handling account for 8% of all of a cargo airline's operating costs. "A cargo airline needs warehouse inventory controls, unit load device (ULD) stock control, manifest and flight prep facilities," says Nick Barlow, senior manager cargo solutions at SITA. The headcount and number of staff employed by cargo airlines based in developing countries, such as China and India, is higher than in western ones because of less automation. Reducing the headcount and labour cost in handling cargo has become a priority for worldwide cargo airlines.

The ground-handling labour cost, however, is not the only cost that a cargo airline is able to target for reductions. When an airline transports cargo and passenger luggage on the same flight, the cost for lost luggage and cargo will be considerable. European airlines lose 12 bags for every 1,000 passengers they carry. KLM and British Airways (BA) are the worst hit by compensation costs for lost and damaged luggage. New legislation issued by the European Commission means that the maximum compensation claim for lost or damaged luggage has trebled to $1,200, thereby costing the industry close to $1 billion a year.

"The cost savings realised from automation will vary on a case-by-case basis depending on staff and facility costs. Most of the cost savings can be attributed to improvement in efficiency," says Barlow. "Any carrier with reasonable volumes would have great difficulty responding to customer queries as to the status or whereabouts of their cargo without automation. If it takes one staff member one hour to respond to a customer query using manual records, but one minute with automation, then the potential savings in time and money will be considerable."

So far all IT systems available to cargo airlines concentrate on automating the airway business, whose costs have been reduced and efficiency has been improved. Among all the technologies and systems to be developed and employed by airlines to reduce the labour and lost cargo costs, radio frequency identification (RFID) is emerging as the most significant technology.

Cargo automation system

With the assistance of cargo automation systems, FedEx and UPS have reduced the traditional 40 steps necessary to transport a shipment to a mere 11, with four quality steps. Various software solutions are available on the market now.

SITA Air Cargo provides database and other basic functions to cargo airlines, including a function to track and control unit load device containers and keep flight records.

Sabre CargoMax Suite provides solutions for cargo revenue management, cargo claims management and cargo shipment scheduling and tracking.

Of all the systems available on the market, the most prominent is the CSP™ system developed by Kale Consulting, which has proved to be a success at Asiana Airlines Cargo (Asiana).

Asiana is South Korea's second carrier and ranks globally among the top 15 cargo airlines in terms of international freight traffic. Over 75% of Asiana's revenue is derived from international flights.

Asiana went live with the latest release of Kale's CSP™ in December 2003, replacing the long-standing legacy FAST 4 operational system and many other ancillary systems. Asiana uses the complete suite of CSP™ products, which include: CSP-RES™ (Space Control, Allotments, Reservation); CSP-PRICING™ (Online Pricing System); CSP-OPS™ (Export and Import Operations, Irregularity and Claims Management); CSP-AMBER™ (Cargo Revenue Accounting System); and CSP-ULD™ (ULD Management System).

Several freight carriers have introduced cargo automation systems that have reduced the number of steps required to transport a shipment of freight from 40 to just 11. SITA and Sabre are two providers of such systems.

Asiana had previously used myriad systems that operated on various platforms resulting in a jungle of codes; a situation prevalent in legacy systems. The airline needed an integrated solution for reservations, operations and revenue accounting, which Kale achieved by integrating many existing critical applications into one, and developing an easy interface to the other non-critical ones. Kale had not only to meet the operational needs of a modern airline, but also to help Asiana deliver greater value to its customers. Asiana wanted to achieve substantial improvements to its business process and seek vital yield and revenue information to enable strategic and tactical decisions.

The FAST 4-based Reservations and Operations system, along with the Cargo Revenue Accounting system, was replaced by CSP™. The built-in AMS module within CSP™ replaced the existing standalone module earlier used to transmit data to US.

CSP™ complies with the specific CAR-IMP messages that facilitate exchange of data between freight forwarders, customers and other airlines. The Cargo Revenue Accounting module also generates the industry-specific files.

CSP™ has reduced the recurring cost of running a mainframe system by more than 40% per year. The accuracy of the ULD records has increased from 55% to 95% .The ability of CSP™ to interface with other existing systems has also eliminated data duplication, thereby improving staff productivity by 5%.

This allows Asiana to provide its customers with access to their cargo data, which includes the status of the shipment and the date when the shipment is expected to reach its destination. Asiana's customers are therefore better able to plan their production and logistics. The system combines sales data, operational data and billing data to give the airline's management a true picture of the performance of flights, agents, stations, and routes. CSP™ also allows the airline's sales and operations staff to take operational decisions based on the revenue and yield information that it provides. This information is also available at the time of booking the cargo, thereby enabling Asiana to estimate the profitability of flights before departure, where previously they would only have known the profitability of a shipment long after it had been undertaken. Combined with Asiana's single integrated system, this rapid access to operational data ensures that Asiana will be able to use the power of management information to its maximum. Enhanced customer service, with a reduction in customer response time of 33% and tighter processes, has led to increased customer satisfaction. The solution has enabled improved decision-making by providing Asiana with vital yield and revenue information at an early stage, thereby allowing timely tactical and strategic decisions to be taken.

The system's component-based approach has allowed the airline to migrate step by step, rather than all in one go. The high-level flexibility and scalability of CSP™ has enabled Asiana to incorporate more businesses, newer technology, and new routes, rules and volumes all at the same time without having to change the application software. The airline does not need to reinvest in hardware and technology with every incremental growth, since CSP™ allows building components to meet newer business changes. The application can work on any platform and help manage any volume of business without the end-user having to worry about scalability.

AllFusion Gen, a widely-used cargo software, permits Kale to develop, maintain and support the application independent of a target hardware platform (or operating systems or database) and a middleware.

RFID

Radio frequency identification (RFID) is an automatic identification method. It relies on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be attached to an animal, person or product (or even incorporated into the latter), for the purpose of identification using radio waves. Chip-based RFID tags contain silicon chips and antennae. Passive tags require no internal power source, whereas active tags do. An RFID system may comprise several components: tags, tag readers, edge servers, middleware, and application software.

The purpose of an RFID system is to enable data to be transmitted by a mobile device, called a tag, which is read by an RFID reader and processed according to the needs of a particular application. The data transmitted by the tag may provide identification or location information, or specifics about the product tagged, such as the price, number, colour and date of purchase. RFID is not new, having first been used in tracking and access applications as far back as 1932, when its purpose was to identify aircraft as friendly or unfriendly ('identify friend or foe' (IFF)). RFID quickly gained attention because of its ability to track moving objects. As the technology has been refined, more pervasive (and possibly even invasive) uses for RFID tags are being developed.

In a typical RFID system, individual objects are equipped with a small, inexpensive tag. The tag contains a transponder with a digital memory chip that is given a unique electronic product

The use of RFID will have several applications. RFID tags will be used to track and manage ULDs, as well as passenger baggage, bringing savings of millions of dollars per year for many airlines.

code. The interrogator, an antenna packaged with a transceiver and decoder, emits a signal activating the RFID tag so that it can read and write data to it. When an RFID tag passes through the electromagnetic zone, it detects the reader's activation signal. The reader decodes the data encoded in the tag's integrated circuit (silicon chip) and the data are passed to the host computer. The application software on the host processes the data, and may perform various filtering operations to reduce the vast and often redundant information on the same tag to a smaller and more useful data set.

An advanced automatic identification technology, such as the Auto-ID system based on RFID technology, offers two advantages for inventory systems. First, the visibility provided by this technology enables accurate knowledge of the inventory by eliminating the discrepancy between the inventory record and physical inventory. Second, the RFID technology can prevent or reduce the sources of errors. The benefits of using RFID include the reduction of labour costs, the simplification of business processes, and the reduction of inventory inaccuracies.

The International Air Transport Association (IATA) believes that RFID will enable it to achieve savings of $800 million as part of its 'Simplifying the Business' programme. It also hopes to improve baggage service by implementing RFID. The IATA baggage working group has been involved with RFID since 1997. It faced issues of cost and standards in deciding upon a frequency for the tags as, although 2.45GHz tags were the first to be used, there were issues regarding the power level required to obtain a read range.

Baggage handling suffers due to bags arriving early or late, processing delays, and breakdowns in the baggage-handling system. The RFID interrogator increases the number of possible read points in a baggage system, yet it is not as complex a machine as a barcode reader. It is also inexpensive.

A faster and more efficient baggage handling process also means that bags on the verge of missing their intended flight have a greater chance of making it to the plane on time, which provides a better service for passengers, and savings for airlines.

RFID has been employed by airlines worldwide. Finnair claims that the use of IBM's RFID solutions has allowed the Finnair Group to make rapid improvements to the efficiency of its airport operations at Helsinki-Vantaa International Airport. IBM is also taking charge of the innovative solution for the allocation of employee tasks at Northport Ltd, which is a member of the Finnair Group and a major supplier of ground handling services.

China has adopted the latest RFID technology in the country's air services, although its approach is a steady and cautious one. The first RFID luggage tracking system has been adopted on Cathay Pacific Airway's Beijing-Hong Kong route. It is also claimed that Beijing Capital Airport has spent more than RMB4 million ($500 million) on introducing RFID technology, and expects to build the RFID luggage tracking system in two phases. The work is expected to be completed by October this year.

BA loses 18 out of every 1,000 pieces of luggage and reimburses customers an average of £55 ($100) for each item. The airline believes that it could make large savings each year by introducing RFID technology, since it could reduce its read error rate to nearly zero. BA also intends to insert the tiny chips into passengers' bags, so that they are less likely to be separated from luggage than barcode labels.

Although RFID offers potential benefits to operators, the cost of establishing it is the main barrier to airlines adopting the technology. It is estimated that $6 million is needed to set up a small RFID system in a medium-sized airport or cargo station. The other barrier is that the radio frequencies of the systems vary between continents. The difference in frequencies between the US and the EU, where RFID is most needed, makes it hard for the technology to be accepted by member airlines in the same alliance. Once the airline industry has reduced the cost of RFID and unified the frequency standard, it will become the prevailing technology used in freight, as well as passenger, services.

Cargo revenue management

Cargo airlines worldwide have always wanted to maximise their revenue by adopting a revenue management (RM) system similar to passenger airlines', which can manage their capacity, forecast the ups and downs of price and consequently maximise revenue. Some IT experts have been advocating the necessity of such a system *(see Strategies & systems for improving freight yields, Aircraft Commerce, Issue 42, August/September 2005, page 49)*.

The enthusiasm for RM, however, has not been shared by the air cargo industry. To date, no cargo airlines have ever adopted an RM system as complex as the ones used by passenger airlines. "Most carriers rely on long-term (blocked space) contracts with forwarders, based on fixed capacity and rates. Applying RM rules inevitably means refusing certain shipments. This can cause resistance from forwarders," says Barlow.

There are relatively few cargo revenue management systems available, but Sabre's CargoMax is one system. It works by improving cargo space management.

"There are three main reasons for this," explains David Hoppin, managing director at Mergeglobal. "First, airport-to-airport passenger demand is much more statistically predictable than airport-to-airport freight demand. Second, the profit consequences of wrong predictions are far greater for cargo than for passengers. Third, cargo RM is primarily about allocating a given flight's capacity to different origin-destination (O&D) markets, rather than managing the mix of fares sold to passengers in the same O&D markets. The passenger airlines operate in a consumer market where millions of people make discrete purchase decisions. Passengers may have ever-improving information about their options each time they make a booking, but an individual passenger's purchase decision does not measurably affect airline profitability. Airlines can therefore play the statistically-derived 'booking curves' to hold back inventory in the hope that late-booking customers can be charged a relatively high price, and seats can be released into the market at low prices if actual bookings fall below the levels predicted by models. In contrast, cargo airlines (as well as the passenger airlines' cargo departments) operate in an industrial market where a handful of very well-informed customers (freight forwarders) control the majority of traffic on each route. The decisions of an individual forwarder are less easy to predict, especially by a statistical model, and can materially affect the profitability of an airline's route. If a cargo airline guesses wrong and loses a big forwarder, it will have to replace a lot of lost business in a hurry. Nevertheless, while I do believe that cargo RM systems can improve a freight forwarder's profitability, it is also the case that the percentage improvement is unlikely to be more than a fraction of that which can be achieved on the passenger side of the business."

Despite the harsh reality facing IT providers, some leading software companies have still produced sophisticated cargo RM systems, which are nevertheless simpler than those used by passenger airlines. Among the leading software available is Sabre's CargoMax Revenue Manager. The software increases cargo profits through effective cargo space management. Extensive computer models estimate capacity for each departing flight and determine the most profitable space allocation for various cargo products. Optimum overbooking levels are calculated by the software, and the operator is therefore able to intentionally sell more cargo space than is available to offset the effect of cancellations and no-shows. The software is able to provide three types of forecasting, including capacity, show-up rate and demand. Available cargo capacity is computed for each departing flight in terms of weight, volume and containers. This forecast is based on current and historical operational conditions. The ratio of the actual amount tendered to the weight or volume of cargo booked is expressed as the shipment show-up rate. Based on the historical average of similar shipments, the rate can be computed by market, product, shipper or a combination of these factors. These data are then used by the overbooking model. Sophisticated demand models are used to forecast demand both at flight level and at the O&D level. The software provides an efficient method for evaluating the impact of various circumstances, such as extreme peaks and unusual market demand, which may have no capacity allotment. Alternative routes that carry a shipment from its origin to its destination are created by considering shipment characteristics and aircraft limitations. Available cargo capacity is distributed to shipment requests for optimal revenue gain. Shipment feasibility checks cover the areas of available capacity, service time window, equipment type, connect points and minimum/maximum connect times. Booking shipments, modifying existing shipments and checking the status of confirmed and unconfirmed bookings can be quickly carried out. The software recommends bid prices and gradients for various flight legs that assist with market allocations. This is accomplished by employing O&D and rate-class-based revenue mix methodologies. Using unit profit contribution to evaluate revenue mix provides cargo airlines with the flexibility to treat shipments differently based on certain business relationships. However, the system can also evaluate revenue mix based on revenue, revenue adjusted by value and profit adjusted by value. The system also provides tools to measure the revenue enhancement due to overbooking and network management, including demand forecasting, route generation and bid pricing functions.

"Most suppliers of RM systems claim that they contribute to an increase in revenue of 2-3%. It is very difficult to prove whether the increase is due to the RM solution or general market demand," says Barlow.

Summary

The air cargo industry has been evolving as a result of the development and involvement of modern IT systems. Some systems, such as air cargo revenue accounting systems, have now taken centre stage, while new technologies, such as RFID, have only just caught the industry's attention. The role of RM systems remains controversial in the industry, although various products are now on the market. Cargo airlines must choose the most suitable system for them carefully. AC