For decades airline purchasing departments have had to cope with the laborious task of parts acquisition using outdated and unreliable techniques. The Internet has opened up an array of methods airlines can use to acquire and manage their stocks more efficiently.

Can the internet improve inventory acquisition costs?

In recent years the Internet has been applied in several ways as a tool for airlines and maintenance facilities to acquire rotables and expendables. These applications are as numerous as the variety of reasons why airlines and maintenance facilities need material. The Internet is one of many electronic interfaces that have been devised for material acquisition. Can the Internet then aid a cost reduction in material acquisition and management?

Traditional parts acquisition

Prior to the Internet, airlines had two basic means of acquiring material. "The electronic method was using Spec 2000, which uses a standard data transmission code via SITA," explains Irvin Lucas, vice president sales and marketing support at Volvo Aero Services (formally The Ages Group). "Spec 2000 has been used for the past 20 years, and used to make order requests for new parts from the original equipment manufacturers (OEMs) and vendors. Order requests placed by airlines could then be acknowledged by the OEMs and sent back to the airlines. Spec 2000 uses an electronic data interchange (EDI). EDI is only used by the top 30% of airlines, which account for about 70% of the world's transactions. The remaining smaller carriers have had to use more basic methods of communication."

The only alternatives to EDI were enquiries by phone, fax or e-mail.

"Airlines using these had to make requests using part numbers from catalogues, and this was subject to errors," says Lucas.

Studies made by the Air Transport Association show that the difference in cost between a manual order and one made by Spec 2000 is at least $40, in favour of Spec 2000. "This is the variable cost of labour," explains James Rutledge, director customer material services at Airbus Industrie. "Small airlines did not use Spec 2000 because their volume of transactions could not justify the expenditure in information technology (IT)."

The Inventory Locator System (ILS) was devised by the Memphis Group in the late 1970s and sold to Ryder Systems. ILS was a computer-based database which allowed suppliers to list parts they had available on the aftermarket. Buyers required an account with ILS, and then could use it to see which suppliers had a particular part number available. "The inventory placed on ILS was purely a listing, and buyers then had to contact suppliers to make enquiries about prices," says Lucas. "A shortcoming with ILS was that inventory placed on it was not updated once it had been sold, so buyers could waste time enquiring about unavailable parts. ILS could not be used to make purchase transactions, and received revenues based on the listings. There was therefore no incentive to update information. Brokers also tended to list parts they did not have available,

and would only go to buy a part from another supplier if they had an enquiry."

"A buyer could search for a part and find it listed five times. The buyer would then have to make five separate enquiries," continues Lucas. "Buyers typically need information on price, when the part can be delivered, traceability and its repair status. Thus when an enquiry was made each seller had to send all the associated paperwork for the part. The buyer would then have to go through a large volume of paperwork, before making a purchase decision. Engineers at an airline may advise that parts from certain suppliers did not have acceptable traceability or repair standards. Parts from other suppliers would be sold to other buyers in the meantime. This means a lot of time is spent and wasted for each purchase made."

Buying parts using these methods is laborious. Once enquiries have been made on either Spec 2000 or ILS, buyers have to get information back from the buyers, make further enquiries, get paperwork, make negotiations, make purchase orders and then get the paperwork on the part. "This can take up to eight stages," says Lucas. "The huge volume of paperwork involved when buying parts on the aftermarket means buyers cannot complete all the research they require to get the best deal, and so often go to the OEMs to save time. This inevitably leads to them spending more than they would if they could get better deals on the aftermarket."

Prior to the Internet airlines bought excessive amounts of consumables and rotables to avoid shortages of parts. Airlines also tended to keep expired items in their inventories. Much of this excess was due to a lack of accurate information regarding availability, pricing and tacking of parts. The Internet has the capability to change this.

Internet evolution

The Internet has several possibilities to make acquisition a more streamlined process. "The Internet allows buyers to shop on-line, including completing transactions," says Lucas. "That is, suppliers not only provide real-time data of parts availability, the Internet also makes it possible to complete transactions on-line. There are several sites for parts procurement. These include Aero Exchange, Cordiem, Aerospan, Avolo, ILSmart.com and Partsbase.com. Most of these provide their members with a purchasing solution to make buying more efficient. Spec 2000 requires a sophisticated information technology department, and consumes a lot of man-hours. While smaller airlines could not justify Spec 2000, many have begun to use the Internet for their purchasing. The Internet is much simpler and only requires the use of a PC."

The Internet allows a transaction to be completed in a single process. Parts can be identified and prices listed, traceability can be checked and purchase orders made. "The same purchasing department can therefore complete a larger number of transactions over the same period. Buyers have more information, especially prices. The information they require has been made more transparent, and will make it easier for buyers to search the market," says Lucas.

Internet applications

The different requirements for parts and materials, and the number of different supply routes inventory can take, each provide an opportunity for applications on the Internet.

"The Internet has various applications in trading parts. This is because it can constantly monitor stock levels and so consequently provide real-time information to airline and maintenance facility buyers," says Steve Neason, manager of information systems at Boeing Spares. "Because of this advantage the Internet now accounts for 45% of our business transactions. The smaller airlines immediately started to use our Internet site when we started it in 1995."

Boeing's Internet transactions are mainly high volume deals of expendables. Since these are low value, they are a natural cost reduction target for buyers. Airlines may only come to Boeing for high failure rate rotables when items in their inventory wear out. "While half of our transactions are now conducted over the Internet, the other half are still conducted by less efficient means," says Neason. "Small airlines, which previously used the cumbersome method of faxing orders, use the Internet to place orders. All they need now is a PC. Some airline buyers even work from home! The large airlines use our Internet ordering and purchase site to get real-time price and availability information. Each transaction has a value only in the order of $500, but we process about 30,000 per day."

The advantage of the Internet over older methods is that the buyer has real-time information. This should then allow buyers to hold smaller volumes of consumable inventories. In the past when availability information was not accurate, airlines and maintenance facilities always had an abundance of material to ensure they did not run out. "Our Internet site allows buyers real-time viewing of Boeing's database. The site then allows parts to be ordered, and also the shipping status to be checked following the purchase order being placed. The longest shipping time is 24 hours," says Neason. "Airlines can thus check availability with 99.47% accuracy, order and receive material in 24 hours. Provided material is always available, buyers can purchase only exactly what they need only 24 hours in advance. This is a change from ordering excessive quantities days or even weeks in advance."

Rotable inventories

The Internet has several applications in the management and acquisition of rotable inventories. Manufacturers had tended to exaggerate the inventories airlines required to ensure continuous operation of their fleets. Airlines usually overstocked to avoid aircraft-on-ground (AOG) situations as a result of parts shortages. "The problem airlines have always had is their ability to monitor and control the inventory they required and had, and this led to higher costs," explains Ted Anderson, vice president of business development and operations at AAR. "Airlines have become more sophisticated. One example is where many have informal and formal arrangements with each other to swap, borrow, exchange or pool parts with low failure rates."

As with expendable purchases, the main problem with managing rotables has been tracking parts and making accurate assessment of inventory requirements. Excess inventory often arises because obsolete parts cannot be identified or tracked through the removal, repair, test, store and re-installation cycle. Various tracking systems have been devised, and these allow surpluses and obsolete items to be identified. Excess inventory can then be sold. "The Internet has provided a mechanism for evolving
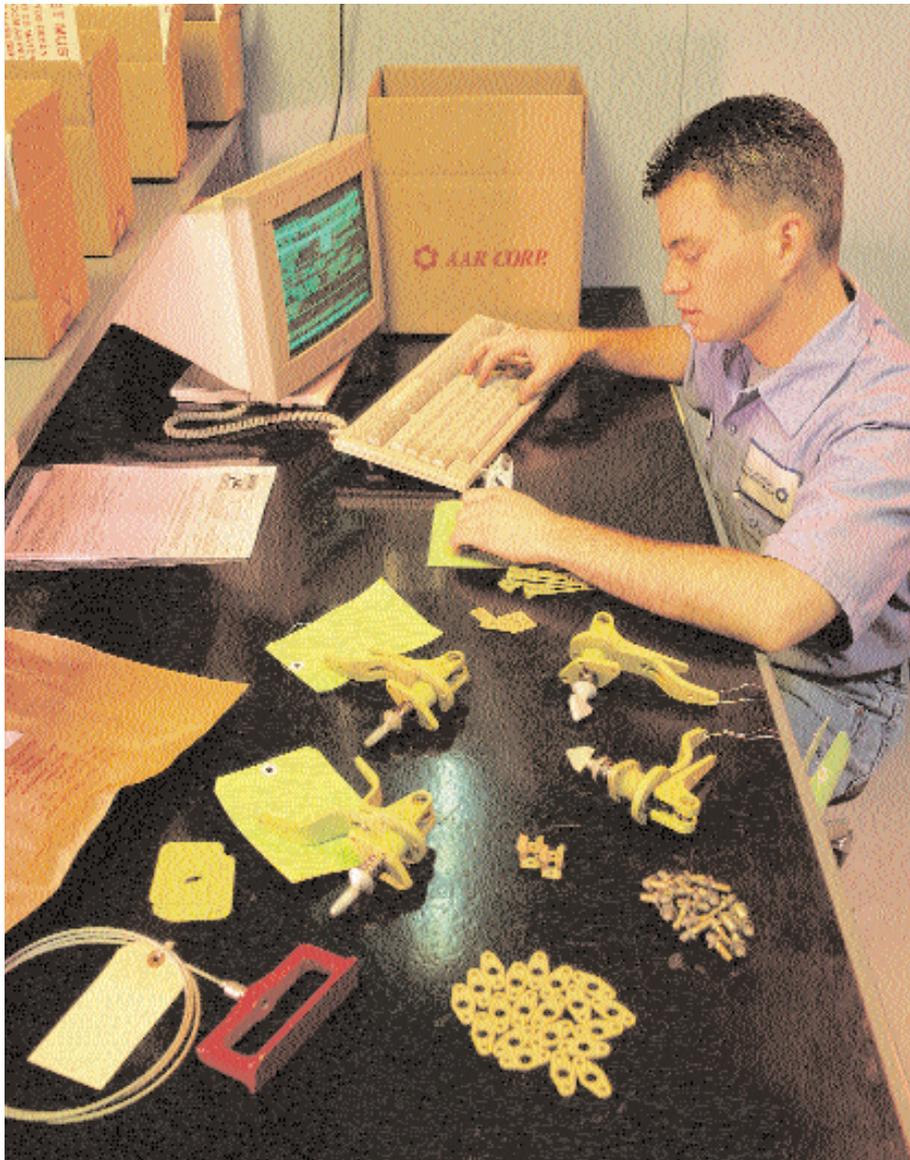
these tracking and identification systems," says Anderson. "Because real-time data is used, excess inventory can be pinpointed. The Internet can also be used in the purchasing and acquisition process. Many airlines use several vendors, and it has always been hard to keep track of how much material is being acquired and at what price from each compared to what is required."

AAR has developed an internet-based inventory tracking and management system. "The three airlines of The Taca Group had a mixed fleet and a huge inventory to support them. This resulted in a large expenditure with several vendors. The Taca Group went for an all-A320 fleet, and so needed to phase out inventory for the older types, while maintaining sufficient stock to support the diminishing fleet," says Anderson. AAR proposed an internet-based supply chain management system. Previously Taca had three different computer systems. "These were not communicating," explains Anderson. "Each of these catered for each of the three airlines. Each system managed the inventory for its airline at its base.

Because they were not communicating, each of the three airlines carried safety levels of inventory, but together the airline group had an excess to its requirements. We thus set up one system to manage the inventory and parts procurement for the group."

AAR's system devised for The Taca Group checks inventory in terms of what is being repaired, tested and in transit. "The Internet thus tracks the stock and indicates where it is in the supply chain," says Anderson. "Another example of where the Internet plays a useful role is in dealing with AOG situations, which are a parts seller's dream. The internet can be used in these situations to see if the required parts are due to come out of the shop, and so if possible avoid expensive purchases from outside vendors at escalated prices. While large airlines have installed computer systems to track inventory, small carriers have been unable to afford them. The Internet provides a cheap alternative. The Internet also allows inventory to be managed on a real-time basis. Tracking systems can be programmed to flag up excess inventory, which can then be sold."

Administration

Another main benefit of acquisition through the Internet will be the reduction in administration in airlines' purchasing departments. "Traditional methods of acquiring rotables required 30-40 pages of paperwork for each component," explains Taylor White, director of marketing at Source One Spares. "This had to be faxed or mailed. Using the Internet this can be discarded, since all the documentation can be kept and sent in electronic format. This saves a large administrative burden for both buyers and sellers. We believe Internet purchasing will catch on, since it provides an extra distribution channel. Acquiring parts on-line takes just 15 minutes. The traditional system takes several hours, because of the paperwork, and checking by engineers."

In some cases availability of a component was duplicated, because a number of different vendors had it listed. Some vendors were brokers acting as middlemen, selling the same part as an independent supplier with a profit margin attached, thereby raising the price. "The Internet should provide real-time data on availability of a part and its price. If serial numbers are provided it will reduce duplication of parts listed, or at least make duplication visible to the buyers,'" says White. "Instantaneous pricing will have to be made by vendors for them to avoid losing the deal, but this is yet to be developed. This should drive down prices in the long-term. Listings of available components should also become more accurate. Real-time data could also mean middlemen and brokers can be cut out, making it cheaper to purchase material. This will not happen instantaneously, however, since many small airlines have a limited number of suppliers they rely on. Airlines have to approve vendors to carry out transactions for them. It takes a long time for a supplier to get approval from an airline, and some suppliers are brokers acting as middlemen. It will take a long time to persuade airlines to purchase material directly themselves. Over the long-term airlines may find that using the Internet will reduce their purchasing costs because they can go directly to the parts suppliers."

Another advantage of the Internet is

A main benefactor of the Internet will be small carriers. Many cannot justify the expense of a purchasing department, and rely on suppliers. The Internet has the potential for buyers to conduct transactions in as little as one eighth of the time that conventional systems allow. Moreover, buyers only require a PC. It is expected that there will be consolidation of Internet sites, and the winners will be those that integrate all the suppliers' sites into one. This will provide airlines with a streamlined supply chain.

that an airline buyer can quickly and easily access all the information needed to make an informed purchasing decision. In addition to providing availability information like many other Internet sites, The Memphis Group's Internet site Bcomm.com allows airlines to customise Bcomm's databases to meet their individual needs. Prior to placing an order for a given part number, the airline buyer can access their own historical purchases as well as interchangeable alternates and PMA parts approved for use by that airline. Without this information being readily available, a buyer can easily purchase a part for which the airline has alternate part numbers in stock. Bcomm can also provide the buyer with traceability information, serial number, repair vendor, repair date, and purchase price of the part being considered for purchase. Once the purchasing decision is made the buyer can launch a purchase order through Bcomm, receive an acknowledgement from the seller and be advised of any changes to the order and notified of shipment.

John Williams, president of The Memphis Group, feels the Internet's biggest potential is in the savings made in the administrative cost of buying material, rather than in savings made in better pricing. "It is estimated that it costs an airline $50-100 to issue a purchase order, and a carrier with a fleet of 100 aircraft probably issues 5,000-20,000 orders per month. It is thus spending $250,000-2,000,000 a month on the administrative costs of buying material each month. The Internet can be used to reduce this cost of purchase orders, but the airlines seem reluctant to make the internal changes in procedures and processes required to make these potential savings a reality," says Williams.

White claims the main advantages of the Internet over other parts information systems are the Internet's provision of real-time data and transparency of information. "This will streamline the buying process," says White. "Source One Spares' Internet service provides all the data and information a buyer requires

to make a rotable purchase. We provide all trace information, part tag number, part and serial number and maintenance condition. The buyer can view all the relevant paperwork on-line, and download it as a pdf file."

Few airlines conduct entire transactions on-line. Prior to the Internet airlines would trust the tag on the part, although the level of trust would depend on the relationship between the airline and its supplier. "Transactions are based on an airline's trust in many cases," explains White. "A supplier doing business with an airline for the first time could fax all the relevant paperwork, but this involves a large number of pages. After some trust had been established the number of pages would be reduced. Paperwork can be faxed, but this has the risk of the airline finding that the repair approval is not accepted by its aviation

authority, and so cannot use the part. This will have taken a lot of time, and the sale could then be lost. Putting the paperwork on-line allows a buyer to make an instant decision, and so increases a supplier's chance of getting a sale."

Internet evolution

Lucas expects there will be consolidation in the number of Internet exchanges. "The better sites will be those which show transaction histories for each part number, which will give buyers a better idea of what they should pay," says Lucas. "Consolidation will mainly come about because airlines really want streamlined supply chain management, and really want to go to just one site. The best sites will integrate all the suppliers' websites."