

## CAN AIRLINES SOLVE THEIR BAGGAGE HANDLING PROBLEMS?

It's been a rough decade for the airline industry. Terrorism scares, rising fuel prices, and overall economic malaise have combined to damage airline companies' bottom lines. In 2007, nearly every major airline began charging baggage fees to generate revenue. Travelers were already unhappy about the poor baggage handling service they received, but paying for often spotty and unreliable baggage handling service was one of the biggest sources of customer dissatisfaction throughout the industry. In 2008, nearly 2.5 million bags were lost or delayed.

To promote customer good will as well as reduce costs, airlines have developed state-of-the-art baggage handling systems designed to drastically cut down on the number of bags delayed or lost. The statistics suggest that these systems are working. In 2011, the airline industry's mishandled baggage rate decreased to .9 percent, just under 9 bags per thousand, compared to more than 18 bags per thousand five years earlier.

Some of the improvement in the numbers of bags lost or mishandled is due to passengers bringing fewer bags to avoid baggage charges. But updated baggage handling systems have been the major reason for the improvement. Baggage handling systems must perform several key roles: they must move bags from the check-in area to the departure gate, move bags from gate to gate, and move bags from the arrival gate to the baggage claim. The systems must be both accurate and fast, and baggage should move from its current location to its destination faster than travelers can get there.

Baggage handling systems are among the most complex systems in the systems universe because they involve a wide variety of sensors, actuators, mechanical devices, and computers. These systems use over 3 million lines of software program code. Some of the advanced technology used in baggage handling systems includes destination-coded vehicles (DCVs), automatic bar code scanners, radio-frequency identification (RFID) tags, and high-tech conveyors equipped with sorting machines.

At check-in, fliers' bags are tagged. The tags contain flight information and a bar code that all of the computers in the baggage handling system can read. When computers in the system scan the bar code, they process the information it contains

and determine where to send your bag. After being scanned once, the system always knows where your bag is at any point.

Bags are deposited into DCVs to transport them to gates quickly. DCVs are unmanned carts that can load and unload bags without stopping movement. These carts move on tracks like miniature roller-coasters along a "highway" that spans the airport. Computers throughout the system keep track of the location of each bag, its destination, and the time it is needed at that destination. The system can optimize the routes taken by the carts to get the bags needed most urgently to their destinations fastest.

Because DCVs move at high speed and do not come to a full stop to receive baggage, the conveyors must be extremely precise, depositing bags where they are needed at just the right time for maximum efficiency. Once bags reach the gate, they enter a sorting station where airline employees use computer terminals to send bags to the correct plane. Increasingly, system vendors are turning to RFID tags attached to each piece of baggage rather than bar code tags. RFID tags are wireless devices that transmit their location and contents, and make it far easier to track packages than bar codes, which are silent and passive. They are, unfortunately, much more expensive than simple bar code tags.

Baggage handling systems can be extremely expensive, but if implemented successfully, pay for themselves. Lost and mishandled baggage is a major expense for airlines, and reducing the incidence of lost and mishandled baggage creates significant yearly savings. According to the International Air Transport Association, a mishandled bag costs an airline, on average, \$100, and the global, airline-industry price tag for mishandled baggage is \$2.5 billion per year.

In 2007, US Airways lost nine bags for every thousand travelers. After implementing a new baggage handling system at its terminals, that figure dropped to three lost bags for every thousand travelers. US Airways spent \$16 million on scanning technology and other associated costs of their baggage handling system, but the company says the system now saves \$25 million per year and has boosted customer satisfaction.

In 2007, Delta Airlines emerged from bankruptcy to overhaul many of its outdated systems, includ-

ing its outdated baggage handling system. Between 2008 and 2010, Delta installed optical scanners to read baggage tag bar codes, widened and extended its system of baggage conveyor belts, and installed a central control room to monitor conveyor belts and baggage carousels in Atlanta and most of its other airport terminals. The airline recorded a top-notch baggage handling record of just 2.93 mishandled bags per 1,000 passengers, with further improvement the following year. Bags now take less than 10 minutes to travel from terminal to terminal—a process that took as long as 30 minutes with the older system. Delta recently added a service that allows passengers to track their checked bags from scanning at check-in, to the flight they're loaded on, and then arrival at baggage claim.

New baggage systems are not flawless. In July 2010, a software glitch shut down the baggage handling system at an American Airlines terminal at JFK airport. A piece of software failed in the bar code scanning device, forcing airline employees

to sort luggage by hand, delaying some flights and causing a luggage pileup at the ticket counter. The largest baggage system modernization program failure occurred at Denver International in the period 1993–2005. After spending \$250 million, the airport authority finally abandoned the effort and returned to older manual methods, which were slowly upgraded by 2011. The system itself was not a trivial undertaking, with 4,000 vehicles, 5.5 miles of conveyors, and 22 miles of track. The Denver failure provided important lessons for system modernization programs that followed, and better baggage handling technology is greatly improving service for flyers.

*Sources:* Christine Negroni, "Good Airline News: Losing Fewer Bags," *The New York Times*, August 7, 2012; Joan Lowy, "Airlines' On-Time, Baggage Performance Improves," Associated Press, MyDesert.com, April 3, 2012; Timothy W. Martin, "Delta Lets Fliers Check Bags," *The Wall Street Journal*, April 23, 2011; Scott McCartney, "Better Odds of Getting Your Bags," *The Wall Street Journal*, December 2, 2010; David B. Caruso, "Baggage System Breakdown Delays Flights at JFK," Associated Press, July 30, 2010.

## CASE STUDY QUESTIONS

1. What types of transactions are handled by baggage handling systems?
2. What are the management, organization, and technology components of baggage handling systems?
3. What is the problem these baggage handling systems are trying to solve? Discuss the business impact of this problem. Are today's baggage handling systems a solution to this problem? Explain.
4. What kinds of management reports can be generated from the data from these systems?

schedule. Today, many of these reports are delivered online. Figure 2.3 shows how a typical MIS transforms transaction-level data from inventory, production, and accounting into MIS files that are used to provide managers with reports. Figure 2.4 shows a sample report from this system.

MIS typically provide answers to routine questions that have been specified in advance and have a predefined procedure for answering them. For instance, MIS reports might list the total pounds of lettuce used this quarter by a fast-food chain or, as illustrated in Figure 2.4, compare total annual sales figures for specific products to planned targets. These systems generally are not flexible and have little analytical capability. Most MIS use simple routines, such as summaries and comparisons, as opposed to sophisticated mathematical models or statistical techniques.

Other types of business intelligence systems support more non-routine decision making. **Decision-support systems (DSS)** focus on problems that are unique and rapidly changing, for which the procedure for arriving at a solution may not be fully predefined in advance. They try to answer questions such as these: What would be the impact on production schedules if we were to