

**Radio frequency identification is a smart way to keep freight moving forward.**

Sept. 10, 2007—Radio frequency identification technology is becoming increasingly common in our everyday life. Applications for better identification of passport owners, or simple transport payments such as collecting road and bridge tolls and fares for mass transportation, show only a small sampling of how RFID is being deployed. In fact, RFID technology has been implemented in some sectors for more than 10 years now. The same cannot be said about the air-cargo business, however; aside from some local solutions and smaller pilot projects for testing purposes, no major applications yet exist in that arena.

The demand for air cargo over the next 20 years is expected to grow at about 6 percent annually, according to studies of the two largest aircraft manufacturers, [Airbus](#) and [Boeing](#) (Airbus: Global Market Forecast 2004-2005; Boeing: World Air Cargo Forecast 2004-2005). As a result, the cargo market is now being taken more seriously, even by traditional passenger airlines with no special cargo planes. One such airline, [Virgin Atlantic](#), currently chooses its aircraft based on the payload capacity for new destinations in Africa and the Asia-Pacific Rim.



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Strong market growth generates higher competition pressure, and new cost-benefit-sharing models and efficient logistics procedures are required to survive in such an environment. One example is the linkage of cargo airlines within such strategic alliances as [WOW](#) and [SkyTeam Cargo](#). Overall, airlines and freight forwarders are dealing with a higher business complexity and variance. RFID technology contributes considerably to handling these upcoming challenges.

Current RFID applications within the airline industry are primarily limited to baggage handling and identification. [KLM/Air France](#) implemented RFID-enabled baggage tags inside [Amsterdam Airport](#). [Cathay Pacific](#) and [Delta Airlines](#) did the same, with great success, at airports in Beijing, Hong Kong and Jacksonville, Fla. (see [Delta Plans U.S.-Wide RFID System](#)).

So far, the read rates have all been above 99 percent. In Jacksonville, for instance, the read rates at bag belts and on belt loaders have been about 99.8 to 99.9 percent. Bar-code read rates on bags traveling down a conveyor in random orientation can be as low as 67 percent, according to several projects conducted at Germany's [University of Karlsruhe](#), because bar-code labels can be torn, soiled or covered by luggage ID tags.

Due to high RFID chip prices, however, a full RFID-tagging of all goods transported by air is not yet affordable. One mid-term solution might be the mounting of RFID chips on airfreight containers known as unit load devices (ULDs). The analysis of a pilot project run by [Air Canada Cargo](#) in Toronto and Miami showed a 100 percent read rate, even under high volume and with a great diversity of cargo contents. The Montreal Convention regulates tightened liability laws for aircraft carriers in the case of

proven damage; for carriers, it is now crucial to obtain additional information about conditions during transport.

RFID sensors not only identify shipped goods, they can also detect potential damage caused by heavy vibrations, cold and heat, humidity or unauthorized door openings; addressing the latter, in particular, is important to preventing theft loss or terrorist attacks. Such smart containers are also currently being tested in a pilot run by freight-forwarding agent [Schenker](#), a [Deutsche Bahn](#) subsidiary, which uses multi-purpose sensors at sea-freight containers on its Hong Kong-to-Hamburg route (see [Schenker Pilots RFID to Secure Cargo Shipments](#)).

Container tags can be automatically registered at points where liability changes hands (change of custody, or COC). By accumulating this data, a carrier can offer a complete reconstruction of transport conditions in the event of loss or damage. An analysis of this pilot, so far, indicates RFID technology helps to increase visibility at interfaces considerably. The different types of transport units used makes global logistics highly complex, while the diverse freight agents involved provide different services and work with different data types.



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For RFID-related data to be used efficiently, it must be received and exchanged by all partners within the entire supply chain. If ULDs were provided with RFID technology, airline personnel and customers would both be able to track and trace shipments through common Internet applications, down to the ULD level. This would offer higher transparency between logistics providers and airline carriers, ensuring quicker clearance through U.S. customs. The implementation of RFID systems could also help accelerate loading and unloading processes, and reduce the risk of improper loadings, since many identification operations are automated by passing the ID gantry.

Overall, better use of automated stacking equipment could reduce the labor required to identify shipments and increase warehouse efficiency, while also allowing for quicker transfer times through the warehouse, and in truck acceptance and dispatch for road feeder services. By enabling a better knowledge of inventories, RFID technology provides greater control and enables carriers to manage cargo more easily. (Click [here](#) for a diagram illustrating the handling process using RFID-equipped ULDs.) A close linkage between the data-processing centers of shippers and carriers is key to ensuring proper data exchange through the shipping flow.

In addition, airline carriers could profit from the improved container-management capability RFID technology offers. Each year, larger cargo airlines such as [Lufthansa](#) and Air France lose 5 to 6 percent of their ULD inventory—amounting to hundreds of millions of dollars in loss—due to breakdowns in their ULD tracking-facilities. The last-known location of a missing ULD could be traced with RFID, and loss claims could be better attributed to the points of origin. This could reduce the staff time needed to trace

ULD equipment and lower insurance risks. Most important would be the ability to manage location awareness and make sure the right container is at the correct airport facility to meet daily flight schedules and airline requirements. RFID could also help significantly reduce station stock and increase ULD availability, reducing the purchase of new ULDs.

A lack of standards and integrated systems among carriers, however, might pose a barrier to scaling up RFID technology from pilot status, which is why current solutions do not integrate the entire supply chain. Due to the high mobility of ULDs, battery life and power needs will become factors as critical as device reliability and out-of-service time. All of this increases device costs, and 23 million units need to be outfitted for a worldwide standard solution.

High RFID equipment prices might be a burden to investors, but our pilot-project review shows that a return on investment (ROI) comes quickly. The value received in the trials was immediate, because the inventory visibility enabled a clear comparison of the goods recorded with the actual physical inventory. Having true inventory visibility, from point of origin to final destination, was of immediate benefit, while minimizing losses was another considerable value. Clearly, RFID is a key module to ensuring a secure trade line.

An RFID chip can store more specific information than a bar code can, but without a full network and industry-wide standards, an RFID tag is more an addition than a bar-code replacement. Nonetheless, the proven ability to obtain cargo information quickly and easily, and to track and trace goods with accuracy, is a huge advantage to any air-cargo carrier.

The next big step—using the pilot projects as a door opener to daily operation—is sure to greatly enhance data value. When RFID data is integrated into an airline's business system, it can generate a long-term ROI as well. As with all leading-edge developments, RFID technology for the air-cargo business requires careful planning and implementation, but the rewards are visible and verifiable.

The air-cargo industry is nearing full implementation of RFID technology, and each new pilot project brings it closer still. As competitive pressures and the demand for airfreight services grow, RFID will become a necessity.

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