Print

Air cargo and RFID - A smart way to keep "freight" moving forward?

by By Alexander C.H. Skorna and Dr. André Richter

The RFID (Radio Frequency Identifi - cation) technology gets more and more common in our everyday life. Applications in passports for a better identifi cation of its owner or simple transport payments such as collecting tolls and within mass transportation show only asmall area.

Meanwhile in some cases RFID technology is implemented for more than ten years now. So not in the air cargo business, where besides some local solutions or smaller pilot projects for test purposes still no major application exists. But the air cargo demand for the next 20 years is a growing one with annual rates about 6 percent, studies of the two largest aircraft manufacturers Airbus and Boeing show. As a result the cargo market is seen more serious even by traditional passenger airlines with no special freighters such as Virgin Atlantic. As a result, the strong market growth generates a higher competition pressure and new cost-benefi t-sharing models and efficient logistic procedures are required to survive in that environment.

One example is the linkage between cargo airlines in the strategic alliance WOW or its counterpart Skyteam Cargo. Overall airlines and freight forwarders are dealing with a higher business complexity and variance. The RFID technology considerably contributes to handle these upcoming challenges.

Current RFID applications within the airline business are mostly limited to baggage handling and identifi cation. So far, the read rates have been all well above 99 percent. Barcode read rates can be as low as 67 percent on bags traveling down a conveyor, as has been shown in several projects at the University of Karlsruhe (Germany). That is because bar codes can be torn, soiled or covered by luggage ID tags.

Applied to the air cargo environment, this means that, due to high chip prices, a full labeling of all transported goods with RFID tags, is still not affordable. A midterm solution might be the mounting of RFID chips on airfreight containers or ULDs. The analysis of a pilot run by Air Canada Cargo in Toronto and Miami showed a 100 percent read rate, even under high-volume and great diversity of cargo contents.

For carriers it is now crucial to get more information about the conditions during the transport. But RFID sensors do not only identify shipped goods, they also identify potential damages caused by heavy vibrations, cold and heat, humidity or unauthorised door openings. Such smart containers are also currently in pilot run at freight forwarding agent Schenker, which uses multi-purpose sensors at sea freight containers on its Hong Kong – Hamburg route. The container tag will be automatically registered at points where liability changes hands (Change of Custody – CoC). An analysis of this pilot run indicates so far that RFID technology helps to increase visibility at interfaces.

Additionally, various freight agents with different services are involved, who also work with different data types. But for an effi cient usage of RFID related data, data must be received and exchanged by all partners within the whole supply chain. For example, airline staff and customers will be able to track and trace shipments thru common internet applications down

to an ULD level, if the ULD is provided with RFID technology.

This offers a new higher transparency between logistic providers and airline carriers, which guarantees a quicker customs clearance. The implementation of RFID systems supports also an accelerated un/loading process and reduces the risk of incorrect loadings, since many identifi cation operations are automated by passing the ID gantry.

Overall, the labour required to identify shipments can be reduced and the whole warehouse effi ciency increases, because of a better use of automated stacking equipment as well as quicker transfer times thru the warehouse and in truck acceptance/dispatch for road feeder services. With a better knowledge of inventories, the RFID technology provides greater control and allows the carrier to manage cargo more easily. The entire handling process of using RFID equipped ULDs is shown in figure 1. The key is a close linkage between the data processing centres of shipper and carrier to ensure proper data exchange thru the shipping fl ow.

Airlines also profi t from using RFID technology, because of a much better container management capability. Larger cargo airlines such as Lufthansa and Air France lose 5 to 6 percent - and a high three-digit million US dollar loss - of their ULD inventory each year due to break-downs in ULD tracking facilities. The last location of missing ULDs can be traced with RFID and loss claims can be better attributed to its origin. Most important is the ability to manage location awareness; the right container at the correct airport facility to meet daily fl ight schedules and airline requirements. RFID helps significantly to reduce the station stock and increases the availability of ULDs. Therefore a lowering in ULD purchases is possible.

One problem that occurs by upgrading the RFID technology from a pilot status, is the lack of standards and integrated systems amongst carriers. That is why current solutions do not integrate the entire supply chain. Because of the high mobility, battery life and power needs will become a critical factor as much as device reliability and out-of-service time. All this increases the device costs and 23 million units need to be outfi tted for a world-wide standard solution.

Despite the fact that high RFID equipment prices might be a deterrent, our review shows that the ROI (Return on Invest) was short-term in most pilot projects. The value received was instant, because the visibility of inventory enabled a clear comparison of goods recorded with the actual physical inventory. Obviously, more specifi c information can be put on a chip than on a barcode, but without a full network and industry-wide standards, the RFID tag is more an addition than a barcode replacement. The proven ability to obtain cargo information quickly and easily, and to trace and track 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, will greatly enhance data value when integrated in an airline's business system, which also generates a long-term ROI.

Alexander C.H. Skorna (Schenker (Asia Pacifi c) Pte Ltd) and Dr. André Richter (Institute for Conveying Technology and Logistics – University of Karlsruhe)

Print