UHF Tags to be Tested on Planes

Delta Air Lines and FedEx will carry out trials this summer that will place passive UHF RFID tags on some of their planes. Undertaking with the assistance of U.S. aircraft maker Boeing and set to begin next month, the two tests are aimed at determining whether the tags can be deployed effectively on

commercial airliners.

Part of the joint effort by Boeing and European aircraft maker Airbus to develop an RFID specification for their suppliers to tag parts used in the construction of their aircraft (See Boeing Outlines Tagging Timetable), the tests follow similar trials the two plane manufacturers carried out using high-frequency (13.56 MHz) tags. The goal is to use RFID tags to uniquely identify and store details of individual parts, as well as track maintenance details.

Inside a FedEx plane: a pump with a 13.56 MHz smart label.

The trials were announced at the Global Aviation RFID Forum, which the two companies held in Atlanta last week to explain their RFID initiative to their suppliers. One of the tests will see UHF tags mounted throughout the aircraft, with the exception of the engine assembly; the other will place tags on engine components.

In one trial, Boeing and FedEx will attach 40 passive UHF smart labels to various sections of an MD10 freight airliner including the flight deck, avionics compartment, cargo compartment and wheel wells, but not the jet engines. The trial will last 90 days. During that time, six read and write tests will be carried out on each tag. One primary objective is to test how electromagnetic interference resulting from deployment of passive RFID smart label in an airplane will affect the integrity of the smart label’s data. During the test, FedEx will use the freight airliners to transport cargo,

just as it normally would.

The smart labels will be used to store data, including the date the part was installed on the plane, a code identifying the stations where maintenance work took place, identification numbers of each mechanic who worked on the plane and the dates and types of maintenance inspections performed on the plane.

In the future, the companies expect to deploy both high-frequency (HF) and UHF RFID tags, depending on the part being tagged and its location. For example, for engine parts that are large and easily reached by maintenance staff, HF tags operating at 13.56 MHz will be used. For harder-to-access items such as life vests under seats and equipment behind the plastic walls of the aircraft, UHF tags, which offer a longer read range, may be used to enable checking with a single reader pass down the aisle of the aircraft.

The upcoming FedEx trial replicates a recently completed trial by the same companies on the same aircraft involving 13.56 MHz tags. Smart labels that will be used in the UHF test will be placed at the same locations in the aircraft that were used in the previous 13.56 MHz tag trial, which took place without a hitch, according to the shipping services provider.

“The bottom line is that there were no problems,” says Butch Ford, manager of engineering support at FedEx.

In that trial, the 13.56 MHz smart labels consisted of Zebra Technologies z-Ultimate labels embedded with Infineon Technologies my-d vicinity RFID inlays (an inlay is a microchip and antenna joined on a substrate) with 10 kbits of memory. To reduce electromagnetic interference from any metal objects on which the tags were mounted, the labels were also fitted with an Emerson & Cuming Microwave Products Eccosorb nonconductive silicone backing. Technical details regarding the UHF tags that will be used in the upcoming trial have yet to be announced. That trial also proved the integrity of the

adhesive that affixes the smart label to the onboard equipment.

According to Boeing, the smart labels are expected to cost less than $2 each. “That’s less than insignificant. We are certainly comfortable with $2,” says Kenneth D. Porad, program manager for Boeing commercial airplanes’ automated identification program.

Airbus says it also had tested 13.56 MHz RFID tags, deploying the tags on 12 planes operated by a German charter airline last year. “The tags clocked 200,000 flying hours, and we recorded 100 percent accuracy. We didn’t lose a bit,” says Pierre Steffen, vice president of spares, support and services at Airbus.

In a separate upcoming test, Boeing will collaborate with Delta Air Lines to test both 13.56 MHz HF tags and 915 MHz UHF tags on up to eight Boeing 757 twin-engine aircraft operated by Delta on its Atlanta-Jacksonville route.

“FedEx has proven there is no interference issues [inside the plane]. We’d like to do the same thing for engine parts,” says Marty Kangiser, GM material services at Delta Air Lines.

The Delta trial will aim to establish how well tags hold data and can be read when installed on nonrotating engine components. These noncore parts of the engine can reach 500°F, according to Kangiser.

Thirty tags will be placed on line-replaceable parts (parts that can be replaced while the plane is at the gate) in the engine and will hold 1024 bits of data, including each part’s serial number, part number, and manufacturer number. The trial will involve only one of each plane’s two Pratt and Whitney 2037 engines. During the 90-day test, the planes will be used in regular commercial flights.

Delta says it will also run a separate RFID trial within its

own maintenance operation. The trial, which will take place at Delta's Atlanta hub and be completed before the end of the year, will involve the deployment of 915 MHz tags, as well as smart shelves and RFID portals. During the trial, tags will be attached to tools so that Delta can learn about the potential benefits and increased visibility an RFID deployment may bring to its maintenance operations. For example, a portal placed at the entrance to the tool storage area will track which tools are in use at any time.