

Fly-By RFID for Monitoring Power Towers

To help operators of electricity networks monitor their infrastructure for corrosion or damage, IBM's IT-Services and Solutions division is proposing an application combining active RFID tags with interrogators installed on helicopters.

By Rhea Wessel

April 13, 2007—In late November 2005, ice and snow suddenly built up on power lines in northern Germany, causing dozens of steel towers to snap like toothpicks. As a result, hundreds of thousands of people were left without heat and water for days. RWE, the operator of the electricity network, was criticized harshly for the condition of its power masts.

IT-Services and Solutions (it'), a consulting and software subsidiary of IBM based in Chemnitz, Germany, is proposing an RFID application that would help operators of electricity networks better monitor their power lines for corrosion or damage. Active, long-range UHF RFID tags would be attached to the masts of the power lines and read from a helicopter fitted with RFID interrogator antennas. The antennas would be installed under the belly of the helicopter, between the aircraft's two landing skids.

The helicopter's pilot would approach the mast and hover no more than 50 meters (164 feet) away from it, while an engineer riding inside would operate a laptop used to trigger the interrogation of the mast's tag. By interrogating the tag in midair, the energy company would have proof that the engineer gave the tower a visual check to see if corrosion or rust was present. To develop the concept, which has yet to be tested, IT-Services worked with Micus Management Consulting, an information systems specialist.

Ulrich Becker, head of IT-Services' Application Innovation Services business unit, says any energy producer in Europe, Asia and Africa that does not have detailed maps of its network, as German utilities do, cannot rely on GPS for positive identification of its towers. For producers without such maps, RFID could be used to help service personnel positively identify a tower. A record of the last repairs made to a specific tower could also be stored on the active tag and retrieved by the interrogator, enabling engineers to make a quick decision about which work orders to issue.

By storing this information on the tag, the operator could avoid having to use a wireless data network (such as GPRS or UMTS) to retrieve information linked to the tag's ID for a particular mast. However, since the application is only in the theoretical stages, many variations are possible. For example, the airwaves could be used to call up a database of information about repairs, or the tags could be integrated with sensors designed to measure temperatures or the expansion of the steel mast. "It depends on what the customer wants," says Becker. The RFID application could additionally be applied to canals and pipes carrying drinking water, as well as many other infrastructural elements that are difficult to reach on foot or by car.

In addition to taking a reading of the tag, the engineer monitoring the mast would be able to photograph the tower with a digital camera and link the photograph to the tower's tag ID in the information system. These photographs could be studied later and used to verify the towers' condition. The pictures and the positive identification made via RFID would help a repair team save time by confirming which repairs were needed

and which tools should be brought along on the trip overland.

RELATED_ARTICLES The tags' transmission range could be set so the tags could be read from the ground below the tower (a read range of 50 meters would be sufficient), or they could be read when an engineer climbed a tower or used a truck and a lift to reach it. The workers responsible for the repairs would use a handheld reader to update the RFID tag with a log of the actual repairs made. In the event that a battery in the tag was no longer active, a worker could replace the tag while repairing or inspecting the mast.

Thus far, Becker says, no utility company has tested the application, though some associations representing utility companies have shown interest. The designers of the concept have not yet consulted with the helicopter manufacturer to test how antennas could be applied to the aircraft, or to test or address such issues as potential interference with the tags due to the metallic environment. What's more, no RFID hardware vendors have been selected.

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