NDSU research news
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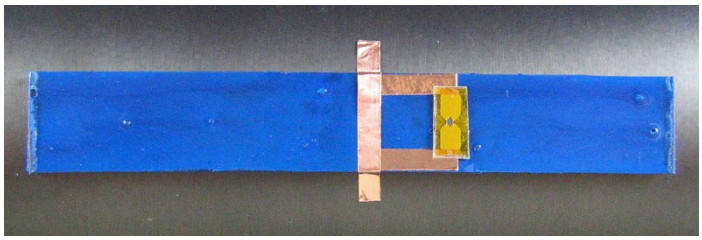

Developed at North Dakota State University's Center for Nanoscale Science and Engineering, Fargo, high-permeability materials divert current into the antennaless RFID tag's integrated circuit. Tags using high-permeability materials in such a way are significantly thinner than those developed using other methods.

ANTENNALESS RFID TAGS DEVELOPED AT NDSU SOLVE PROBLEM OF TRACKING METAL AND LIQUIDS

February 2, 2012 – Fargo, N.D. – Tracking and identifying metal objects can prove difficult for some radio frequency identification (RFID) systems. A patent-pending technology developed by a research team at the Center for Nanoscale Science and Engineering (CNSE) at North Dakota State University, Fargo, could solve these RFID tracking problems. The antennaless RFID tag developed at CNSE could help companies track products as varied as barrels of oil to metal cargo containers.

A typical RFID tag is made up of an integrated circuit (IC) and an antenna. While there are different types of tags available, many don't work well on metal objects or on containers filled with liquid. Previous attempts to solve this problem have resulted in bulky tags that are easily destroyed by routine handling. Researchers at the NDSU Center for Nanoscale Science and Engineering have developed a patent-pending novel approach, with an antennaless RFID tag, allowing for an inexpensive and manufacturable product tracking solution that meets EPCglobal® Standards.

The CNSE research team includes Cherish Bauer-Reich, research engineer; Dr. Michael Reich, senior research engineer; and undergraduate electrical engineering student Layne Berge. The group's research will be presented at the 2012 IEEE International Workshop on Antenna Technology (iWAT-2012) to be held March 5-7, in Tucson, Ariz., with presenters from more than 15 countries expected to participate in the event. The research presentation titled "Low-profile, high-permeability antennaless RFID tags for use on metal objects" is scheduled for March 5.

"Most RFID tags that are to be used on metal objects are made by placing an antenna on a spacer, making them between 0.5 and 3 cm thick, depending on the type of tag," said Cherish Bauer-Reich, research engineer. Such tags can be easily damaged because they stick out so far. The tags developed by NDSU CNSE are less than 3 mm thick and are placed directly on the metal, or could be recessed into the surface of a metal container.

“The tags we’ve developed actually use the metal container as an antenna, rather than having to make and place another antenna on top of the container,” said Bauer-Reich. “Many types of tags have to be spaced away from metal, since it changes the electromagnetic fields around the tags and destroys their ability to communicate. These tags, however, use the metal container as the antenna to transmit information. Because of this unique property, these tags can be used to tag anything from coffee cans at a grocery store to barrels of oil or metal cargo containers, with minimal concern about losing or damaging the tag.”

High-permeability materials divert current into the tag’s integrated circuit. Tags using high-permeability materials in such a way are significantly thinner than those developed using other methods.

The antennaless RFID tag technology developed at NDSU CNSE was developed with support under Grant Number N00189-10-C-Z055, awarded by the U.S. Department of Energy.

The patent-pending technology is available for licensing/partnering opportunities through the NDSU Research Foundation. *www.ndsuresearchfoundation.org/images/pdf/RFT-375*

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