

Tiny antenna could find its way into every home

Ultra-wideband (UWB) antennas are designed for low-energy, short-range transmission of lots of data. Wireless transmission of data from a cell phone or digital camcorder to one's computer is one potential use for a new, smaller-than-ever UWB antenna invented by members of the the [Wireless@Virginia Tech](#) group. Owners of wall-mounted high-definition televisions may appreciate the boon to room décor offered by an antenna smaller than a quarter that can transmit movies from the DVD player to the TV wirelessly.



Taeyoung Yang (center), an electrical and computer engineering Ph.D. student, along with professors William A. Davis (right) and Warren Stutzman, invented the efficient compact ultra-wideband antenna, which is available for licensing from Virginia Tech Intellectual Properties Inc.

Taeyoung Yang, an electrical and computer engineering doctorate student, along with electrical and computer engineering professors William A. Davis and Warren Stutzman in the College of Engineering, invented the antenna. Part of Yang's dissertation focused on the theory for making a UWB antenna as close as possible to the theoretical limit on antenna size and performance.

While there may be personal needs for such technology, the researchers said they hope for more complex and critical applications, such as with pulsed radar systems to prevent collisions between cars and medical imaging systems to detect tumors.

"To our best knowledge, our invented antenna is the world's smallest with more than a 10:1 bandwidth. It has more than 95 percent efficiency for signal transmission, and a fairly constant omni-directional radiation pattern," Yang said.

The inventors' strategy to reduce the size and increase the adaptability of the antenna was to configure it as a structure that can be placed on the inner side of the protective housing, which can be light plastic.



At a size comparable to a quarter, the ultra-wideband antenna is cheap and simple to produce, according to one of its inventors, Taeyoung Yang.

The design also makes it cheap and simple to produce. "The required material

expense is low, the fabrication process is simple, and it is versatile for mounting on curved surfaces," Yang said. "It is convenient to install and disassemble."

Yang, Davis, and Stutzman received the "Best Paper Prize" in the fields and waves category at the 2008 General Assembly of the International Union of Radio Science. Yang has received a number of awards for his research and is a 2008 Torgersen Graduate Student Research Excellence Award Recipient at Virginia Tech.

While the invention is still a prototype, [Virginia Tech Intellectual Properties Inc.](#) is seeking an investor to develop it for the marketplace.

For more information on this topic, contact Susan Trulove at (540) 231-5646.

Sidebar Content

L-Beam Energy Harvester doubles electrical output



Energy harvesters are small devices that convert other forms of energy to electricity.

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Inexpensive roof vent could prevent billions of dollars in wind damage

Hurricanes often lift the roofs off buildings and expose them to havoc and damaging conditions, even after the worst of the wind has passed. A local roofer, Virginia Tech faculty members for architecture and engineering, and a graduate student have devised an inexpensive vent that can reduce roof uplift on buildings during high winds, even a hurricane.

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Energy harvesters – devices that convert other forms of energy to electricity -- are poised to replace batteries, providing limitless power to a wide range of low-power electronics. Virginia Tech researchers have now developed an energy harvester that produces even greater electrical output than similar technology of the same size – slightly smaller than a credit card.



Virginia Tech alumnus Pat Johnson (left) and Jim Jones, associate professor of architecture, inspect the installation of a roof vent prototype in the Virginia Tech stability wind tunnel.

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