Auburn University

Innovation Advancement & Commercialization

Geotextile Fabrics with Electronic Transmission (Antenna) Capabilities

Contact

Brian Wright
Auburn University
Innovation Advancement
& Commercialization
334-844-4977
brian.wright@auburn.edu
https://iac.auburn.edu/
Reference: Geotextile antennas

Inventors

Dr. Gwen Thomas
Associate Professor
Department of Polymer and Fiber Engineering

Dr. Lloyd Riggs
Professor
Department of Electrical and Computer Engineering

Dr. David Elton
Professor
Department of Civil Engineering

Andrew Sivulka
PhD Graduate
Department of Electrical and Computer Engineering

Status

- Subject of U.S. Patent 8,009,120
- Proof of concept demo in road bed field testing (see figure)

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Overview

Auburn university seeks a licensee or a developmental partner for a new fabric design that includes metallic antennas, adding transmission capabilities to materials used for other purposes, such as geotextiles. When added to road bed fabric, these antenna arrays would confer the ability to transmit cellular, Wi-Fi and other signals through the road bed and into vehicles and surrounding buildings. In addition to roads, these fabrics could be added to buildings, bridges or even natural surfaces such as trees.

Advantages

- Transmits cellular/phone or television signals, creating internet hotspots, Wi-Fi access and broadcast capabilities to roadways
- Reduces the overall physical size of the antenna (or array), leading to cost savings
- Functions in tunnels and other areas less accessible by cellular or satellite transmissions, increasing area and continuity of coverage
- Potentially enables other public safety and law enforcement functions such as vehicle speed monitoring, vehicle tracking, traffic re-routing and accident avoidance
- Less vulnerable then current systems to potential terrorist attacks, vandalism and weather disasters, increasing the reliability and safety of the network

Description

This invention embodies antennas consisting of nonwoven textiles with embedded metallic or other wave carrying fibers. These textiles would serve the needed purpose of the textile, such as geotextiles for road bed protection, while adding the functionality of electronic transmission. For road applications, the geotextile and the antennas would include electromagnetic, radio signal and/or fiber optic capabilities, enabling delivery of cellular, Wi-Fi and television signals to vehicles on the road and also to nearby buildings. Transmission to nearby buildings suggests application for this technology in "last mile" situations where other infrastructure is not yet in place. Additionally geotextile antennas would be considerably less vulnerable to damage and likely much less expensive than the current infrastructure.

For work done to date, weaving or a method called warp-knitting is used to knit the polymer geotextile fibers with the antenna material which are coupled to each other by a signal carrier. Dipole antennas are used and they are placed perpendicular to the road so as to achieve minimum interference. A prototype was installed under highway pavement and tested successfully (see figure). A field test for cell phone transmission capability with antennas 50 feet apart demonstrated just a -8 Db loss over that distance. The signal strength of the antennas was found to be -73.3 Dbm.

Licensing Opportunities

- This technology is available for exclusive or non-exclusive licensing
- Joint development opportunities include funded research or a joint venture

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