

Electrically Short Antenna with High Bandwidth

This technology is an electrically short antenna with high bandwidth and portability

Dr. Cohen at Georgia Tech has developed an antenna with high-speed time variation of the conducting path. The antenna consists of a series of segments, and each one is individually controllable. Strategically modulating the conductivity in each segment controls the flow current, and therefore charge, to the ends of the antenna. As such, we can achieve an electrical match with a short antenna over an essentially unlimited bandwidth without the use of physical antenna matching schemes. Antenna can be implemented in two ways: with semiconductors or with a plasma.

Summary Bullets

- **Powerful** – Antenna can be operated at high power levels
- **Stealthy** – Plasma version can be any length and can be hidden easily; can also be rapidly shut off to prevent radar detection
- **Variable** – Most of the design parameters can be rapidly varied, enabling a single antenna to potentially serve multiple purposes

Solution Advantages

- **Powerful** – Antenna can be operated at high power levels
- **Stealthy** – Plasma version can be any length and can be hidden easily; can also be rapidly shut off to prevent radar detection
- **Variable** – Most of the design parameters can be rapidly varied, enabling a single antenna to potentially serve multiple purposes
- **Jam Resistant** – Since conventional VLF antennas cannot operate with the bandwidths that are possible from the plasma antenna, the broadcasts from this antenna are much more difficult to jam or spoof

Potential Commercial Applications

- Global and underwater communication
- Underground exploration
- Global position navigation and timing (PNT)
- EM sensing through electrical conductors
- RFID

Background and More Information

Generation of radio waves with electrically short antennas, where the antenna is much shorter than a wavelength, is a long-running challenge. Efficient radiation is currently possible only in a narrow frequency range, using electrical matching schemes that cancel out the high antenna impedance, but only at one frequency. Current problems with electrically short antennas include electric charge not being delivered down the antenna effectively and small radiation resistance. There is a need for an antenna capable of transmitting more efficiently, especially at low frequencies (<1 MHz) where compact broadband and efficient antennas remain elusive.

Inventors

- Dr. Morris Cohen
Associate Professor - Georgia Tech School of Electrical and Computer Engineering

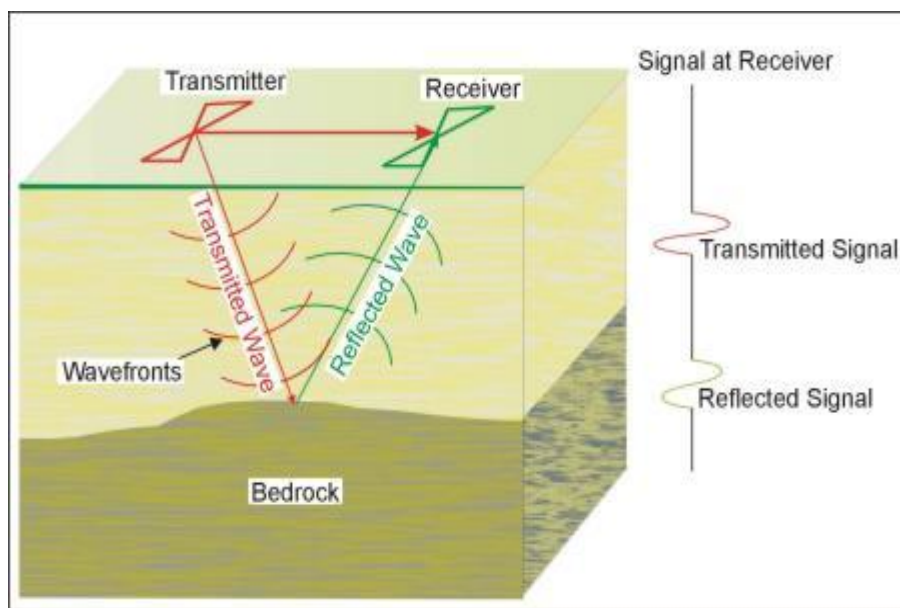
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Publications

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