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Procedure for Designing Conformal Antennas with Maximized Efficiency Bandwidth Product

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Inventors

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Background

There is a pervasive need in both the defense industry and private industry for a conformal, low-profile, efficient, broadband antenna. Conventional antennas project from the surface of airplanes, automobiles, and other equipment, which causes drag and vulnerability to damage. Conformal antennas conform to the surface of an object. Conformal antennas do not protrude from the surface to which they are affixed, therefore they are kept safe from being damaged, and eliminate drag. Advances in electronics allow military and industrial users to exploit wider regions of the wavelength spectrum. Because of this modern growing need, the metal-only conformal antennas that are limited to very narrow bands of operation, are no longer adequate.

Invention Description

Researchers at Arizona State University have developed a method for designing conformal antennas. This invention is a process for selecting the magneto-dielectric materials that are required to meet specified efficiency requirements for an electrically conformal antenna. At the same time, the innovation allows the designer to attain the maximum instantaneous bandwidth. This recipe allows the design of conformal antennas whose gain-bandwidth product can approach the free space Fano-Chu gain-bandwidth product limit. In contrast, metal conformal antennas have gain-bandwidth products that are one to two orders of magnitude lower than the Fano-Chu limit.

Intellectual Property Status:

Patent Pending

Potential Applications

- Antennas broadcasting at high frequency wave-bands
- Communications
- Maritime radio and meteor burst communications
- Space applications

Benefits and Advantages

- **More Frequencies** – Allows for greater segmentation of frequencies
- **More Power** – Reduces internal loss of frequency, improving transmission power
- **Retrofit** – Provides upgrade options for existing equipment

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