Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

1475 N. Scottsdale Road, Suite 200
Scottsdale, AZ 85287-3538
Phone: 480 884 1996 Fax: 480 884 1984

Case ID:M17-092P
Published: 12/28/2017

EBG (Electromagnatic band-Gap) Checkerboard Designs for RCS (Radar Cross Section) Reduction

Inventors

Constantine Balanis

Wengang Chen

Craig Birtcher

Contact

Shen Yan
shen.yan@skysonginnovations.com

Electromagnetic Band-Gaps (EBGs) have been extensively used in low-profile antenna designs because of their in-phase reflection characteristics in certain frequency band(s). EBGs have also been used as attractive ground planes and in checkerboard surface variations.

The incident waves on checkerboard patches induce current densities whose amplitude and phase reflect varying functions. These appealing induced surface current densities act as antenna array elements with different amplitude and phase excitation. This can be taken advantage of. Therefore, this discovery can be used to form constructive and destructive interference scattering patterns to reduce the intensity of the scattered fields toward the observer; thus reducing the Radar Cross Section (RCS).

Researchers at ASU have developed a novel, stealthy technology that can be utilized by objects that need to be invisible. Objects such as aircrafts, helicopters, missiles, and submarines can be hidden using a low RCS which works to mask them from radar detectors. Wide/dual band checkerboard surfaces are excellent ground planes and are used as a part of low-profile antennas that results in low RCS as well as gain enhancement.

Potential Applications

- Military
- Security
- Special Operations

Benefits and Advantages

- Device Geometry – The square EBG surfaces resulted in 10-dB RCS reduction bandwidth
- Checkerboard Surfaces– Checkerboard surfaces are excellent ground planes for low-profile antennas
- Surfaces – Checkerboard surfaces operate on two separate frequency bands

For more information about the inventor(s) and their research, please see

Dr.Constantine Balanis' Directory Page