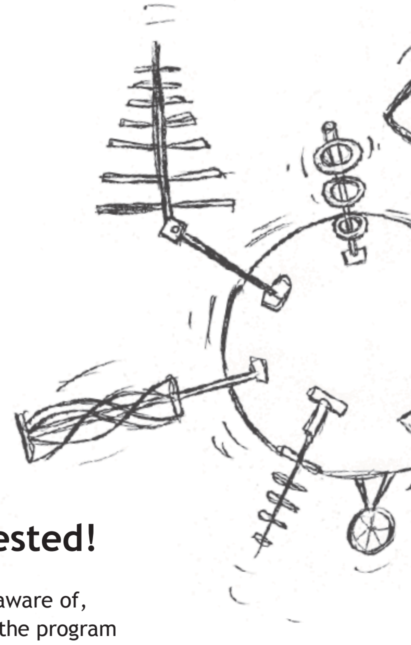


Newsletter 1.3

September 2009

Featuring 6 new antennas of which 4 are user requested!

As mentioned in Newsletter 1.2, we place a high priority on developing and including antennas that have been requested by users. 4 of the antennas added in 1.3 are user requests!

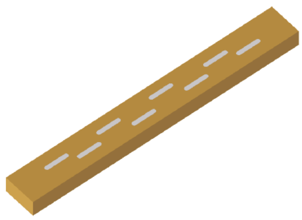
The focus of this newsletter is to provide you with a brief overview of each new antenna in the database. This will help you identify any new antennas that you should be aware of, without having to spot the updates in the program itself. Detailed information on each of these antennas is available inside Antenna Magus 1.3.

Thank you to all who submitted information about new antenna designs. If you have any information (papers, design information, measurements and models) that you want to share with us, please forward it to us or communicate through your local reseller.

What's new from 1.2 to 1.3?

Six new antennas have been added to the database from version 1.2 to 1.3. Each of these antennas have unique design topologies.

Linear resonant waveguide slot array with longitudinal broad-wall slots



The *Linear resonant waveguide slot array* brings something completely new to Antenna Magus. It is the first array of its kind included in the database and this antenna has been requested by a number of people.

Waveguide slot arrays are typically used at microwave frequencies and are particularly popular for radar applications. They are robust, low-loss and can be used in high-power applications.

The Antenna Magus design is very flexible, allowing you to design for a specific gain or beamwidth and to choose the taper that you would like to design for. The internal performance estimation in Antenna Magus takes only 30 seconds to complete and exported models allow the number of slots as well as the position of each slot to be adjusted!

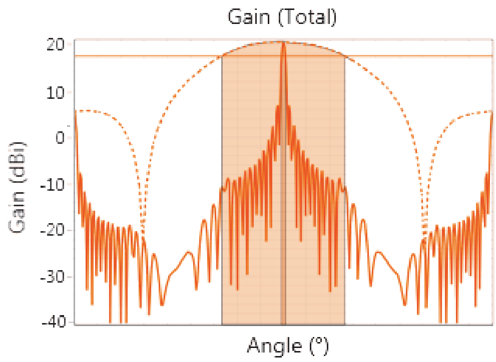


Figure 1. Gain pattern for a 20 dB Linear resonant waveguide slot.

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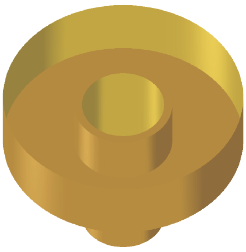
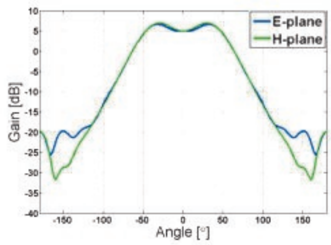
Coaxial-cavity horn

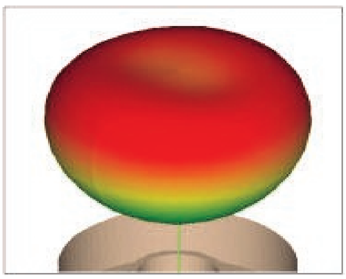


Although this is not a user requested antenna we decided to include it due to its usefulness when needing a feed for a prime focus reflector antenna with small focal-length to diameter (F/D) ratio.

Since the reflector geometry is fixed (parabolic), the performance of a prime focus reflector antenna depends primarily on the characteristics of its feed. To achieve good aperture efficiency the feed should illuminate the reflector uniformly. Popular feed antennas like the *conical horn*, *dielectric rod* antenna and *corrugated horn* do not lend themselves to optimal illumination for deep reflectors (F/D ratios less than 0.35) as their radiation patterns taper monotonically from a peak gain at broadside. The *coaxial-cavity horn* can provide a broader, almost-uniform illumination which is better suited to deep reflectors, as shown in the 2D and 3D radiation patterns below.



2D radiation pattern



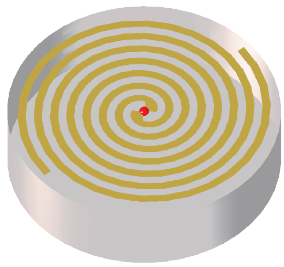
3D radiation pattern

Cavity-backed log spiral

Cavity back spiral antennas have been requested by a number of Antenna Magus users.

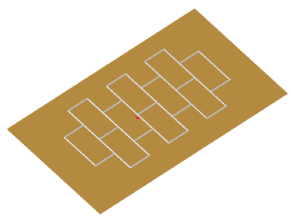
The *Cavity backed log spiral* is typically used in electronic warfare applications. Unlike the *Equiangular spiral* (included in the first release of Antenna Magus) the cavity-backing results in a unidirectional radiation pattern with +- 8 dB gain. Its gain is about 3dB higher than the non-cavity-backed antenna with lower achievable bandwidth. The air-filled *Cavity-backed log spiral* is sufficient for medium bandwidth applications and much simpler to design and model than spirals backed with cavities containing absorbing layers.

Cavity-backed self-complimentary Archimedes spiral



Compared to the *Cavity-backed log spiral* this antenna has similar performance characteristics but may be easier to feed and manufacture. Impedance performance of the *Cavity-backed Archimedes spiral* antenna may be slightly more erratic than the equivalent *Cavity-backed log spiral* across the band.

Wire grid



The wire-grid array was first described by Kraus back in the 1960's as a "*Backward Angle-Fire Array Antenna*" consisting of a grid situated parallel and close to a flat conducting sheet or ground plane. When fed at the

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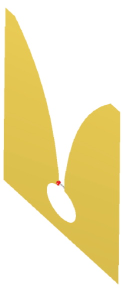
centre the antenna radiates broadside, but by feeding the grid at an edge and adjusting the dimensions of the grid cells, a squint from broadside can be achieved. Though various authors have discussed this antenna (the wire-grid as well as a microstrip version of the topology) there is still some confusion around the operation mechanism of the antenna. When the grid is located a fair distance from the ground plane (around a quarter of a wavelength) the antenna may be compared to an array of dipole elements above a ground plane, with the cell-dimensions chosen such that the array elements are resonant at the operating frequency and correctly phased to achieve the desired radiation characteristics.

By adjusting the cell dimensions and the height of the array above the ground plane one can achieve high gain over a moderate band with beam-steering possibilities as-well as a degree of impedance control. This usually requires a complex feed structure but can also be achieved by using this very simple structure.

Vivaldi



The *Vivaldi* antenna probably got its name from its violin shaped curves. Also known as the exponentially tapered slot antenna (ETSA), this antenna is commonly used in > 3 GHz ultra wideband microwave applications. *The Vivaldi* was also requested by a number of Antenna Magus users. It has an end-fire radiation pattern and can produce a symmetric beam, in the E- and H- plane, over a wide frequency band.

Antenna Magus now has a blog

We are blogging about antenna related issues. Go check it out at www.antennamagus.com/blog