



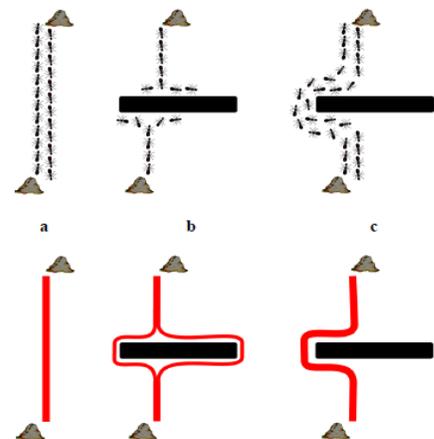
NAB Releases Indoor Antenna Technology Report

On August 18, NAB released a research study titled *High-Performance Indoor VHF-UHF Antennas: Technology Update Report* which examines how recent advances in technology could be applied to the design of high performance indoor DTV receive antennas. The project was conducted as part of NAB's FASTROAD initiative. FASTROAD (Flexible Advanced Services for Television & Radio On All Devices) is a technology advocacy program which seeks and facilitates development and commercialization of new technologies that can be exploited by broadcasters using radio and television broadcast spectrum.

FASTROAD commissioned Megawave Corporation of Devens, Mass. to investigate what technical progress has been made in the area of computer-based broadband and low profile antenna design methods and then to examine existing advanced hardware designs and evaluate the feasibility of applying those designs to DTV reception.

MegaWave identified eight advanced computational methods that could be used as antenna design optimization algorithms. These algorithms can be used to optimize the design parameters for a user specified antenna geometry (e.g. element spacing and length in a Yagi-Uda array) or they also can generate designs that are impossible to achieve otherwise. The report describes a number of "nature inspired" computer search and optimization programs whose function mimics some natural process. For example, "Ant Colony Optimization" (ACO) is an algorithm that simulates (to some degree) the behavior of ants seeking food. The other algorithms discussed are:

- Particle Swarm Optimization (PSO),
- Genetic Algorithm (GA),
- Simulated Annealing (SA),
- Central Force Optimization (CFO),
- Invasive Weed Optimization (IWO),
- Intelligent Water Drop (IWD) algorithm and
- Bacteria Foraging Optimization (BFO).



Ant Colony Optimization: Ants searching the shortest route using a pheromone trail

The report further identifies nine candidate advanced antenna hardware technologies that could be applied to indoor DTV reception. The authors evaluated each technology and sorted the nine candidates into three categories:

- Mature technologies that **do not** require any channel or signal quality information (e.g. via a CEA 909 interface) from the DTV receiver:
 - Fragmented Antennas (Section 2.2)
 - Non-Foster Impedance Matching (Section 2.3)
- Mature technologies that **do** require channel and quality data from the receiver:
 - Active RF Noise Cancelling (Section 2.4)
 - Automatic Antenna Matching Systems (Section 2.5)
 - Physically Reconfigurable Antenna Elements (Section 2.6)
- Emerging technologies that show promise, but are not sufficiently mature or practical at this time:
 - Metamaterials (Section 2.7)
 - Electromagnetic Band Gap (EBG) Materials (Section 2.8)
 - Fractal/Self Similar Antennas (Section 2.9)
 - Retrodirective Arrays (Section 2.10)

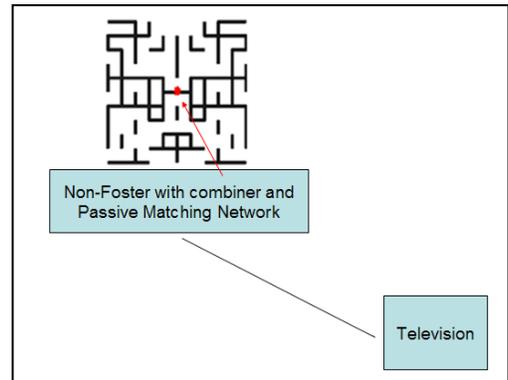
The report then evaluates and ranks each candidate by its maturity, i.e., how close a particular technology's hardware

is to “off-the-shelf” and how well its basic principles have been vetted in scientific literature.

The report concludes by proposing a specific antenna design that employs a combination of technologies and has the potential to achieve superior VHF and UHF performance with the following characteristics:

- 13 x 13 inch in size
- Operating Frequency: 54-698 MHz
- Genetically Designed
 - Fragmented Planar UHF Element
 - Passive Matching at High VHF
 - Non-Foster Matching at Low VHF

The 133-page report is available on the NAB FASTROAD website at:
<http://www.nabfastroad.org/NABHighperformanceIndoorTVantennaRpt.pdf>.



Proposals Now Being Accepted for 2011 NAB Broadcast Engineering Conference

Las Vegas Convention Center, Las Vegas, Nevada
Conferences April 9 – 14, 2011/Exhibits April 11 – 14, 2011
Deadline for [submissions](#) is October 22, 2010.

The 2011 NAB Show will host the 65th NAB Broadcast Engineering Conference. This world-class conference addresses the most recent developments in broadcast technology and focuses on the opportunities and challenges that face broadcast engineering professionals. Each year hundreds of broadcast professionals from around the world attend the conference. They include practicing broadcast engineers and technicians, engineering consultants, contract engineers, broadcast equipment manufacturers, distributors, R&D engineers plus anyone specifically interested in the latest broadcast technologies.

In order to be considered, proposals must explain what attendees can expect to learn from the paper, must not be a sales pitch and should be no more than 200 words in length.

Papers accepted for presentation at the 2011 NAB Broadcast Engineering Conference will be eligible for the [NAB Best Paper Award](#). Established in 2010, the Best Paper Award honors the author(s) of a paper of exceptional merit published in the *NAB Broadcast Engineering Conference Proceedings*. The yearly proceedings, published as both a book and a CD-ROM is a compendium of these technical papers, and an important archive of the leading edge of broadcast engineering issues.

Technical paper proposals submitted for the 65th annual [Broadcast Engineering Conference](#) will be accepted until the October 22 deadline. If you have any questions, contact [John Marino](#), VP NAB Science and Technology at (202) 429-5346.

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