In search of New Antenna Technology

By Gary Nixon, WA6HZT

INTRODUCTION

Probably like many of you, I have been on the quest for new antenna technologies all of my "radio" life… just plugging along, seeking out the newest, coolest, smallest, biggest… every type of antenna imaginable. It has only been in the past five years or so that I have researched the subject seriously, thanks in large part to the opportunities afforded by the Internet. In the next few paragraphs, I'd like to share with you some thoughts and observations on what might be going on behind the scenes of the search for those elusive, "new technology" antennas, and why there just don't seem to be any new ideas hitting the market.

EMERGING CONCEPTS

About five years ago, the antenna world was abuzz with chatter about the Crossed Field Antenna (CFA). Truly amazing, exciting claims and reports were showing up just about every month, it seemed. Not since Marconi's day had such a groundswell of excitement run through the ranks of commercial and amateur radio interests. Following the CFA, a host of other compact antenna technologies emerged with similar or greater claims of small size and high efficiency, driving the RF users of the world into a "what if?" frenzy.

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160m CFA Experiment
See *antenneX* Archive IV
3-Part Series – Year 2000

All you have to do to get a feel for how exciting a time this was is to take a look at a few issues of *antenneX* from the period, read any number of "Stone's Throw" columns, and check the *antenneX* articles themselves. GARDS (Global Antenna Research and Development Society) was even formed during this time to explore and experiment with these emerging technologies, and online forums everywhere were electric with conjecture.

INFECTIOUS EXCITMENT

For the first time, people were seriously considering the reality of antennas that, prior to that time, were the stuff of science fiction. One of the byproducts of this period was that it left many of us with the impression that these new types of antennas were, or could soon become, a happy reality. And then everything seemed to go cold overnight.

All of these “new technology” antennas were born of great inspiration, no doubt. I am a firm believer that there are no “secrets” or “mysteries” where these things are concerned, just information that we don’t know or haven’t discovered yet. With that in mind, all of these inventors believed that they had discovered something new, or had modified something previously known in a way that allowed their antenna to work the magic so many others had sought. I think it is a fair statement that of all of the antennas that have made the spotlight over the past five years, none have clearly succeeded in claiming the “King of New Antenna Technology” crown.

GARY’S INTERNET INNOVATION

With so few houses out here in Northern California USA, the local DSL and cable Internet services are not available, as it wouldn't be economically beneficial for them to provide service. So, 28.8 KB/s dial up (if you're lucky) is still King.

Well, WAS King... I designed a wireless networking system that starts about two miles away at a friend's house, where DSL is available. I then shoot the signal out over the cow patties to a farm on my road about a half mile away, where the signal is repeated and finally received at my home (there's no direct shot between my house and the internet source). Does it work? YES! It works great, and it's stealthy... fully encrypted and invisible to snooping systems.

For the techno geeks in the audience, the radios are Interepoch IWE1100A's using 14 dbi Rootennas at each end with a 9 dbi omni at the repeat point.Worst-case system operating margins are in excess of 20 db. It was not, however, cheap, and suffered a defective radio during setup, making the initial hookup impossible; it took a few days to realize the radio, and not the configuration, was the culprit. **–30-**

WE HAVE LEARNED MUCH

I do not believe it is for lack of inspiration, ingenuity, or earnestness on the part of the inventors that the crown has not been claimed. I think the culprit is to be found in the realities of dealing with antenna consumers these days. As mounting doubt was being cast on each new antenna technology that emerged in the years following the height of the compact antenna “boom”, I believe we collectively became increasingly disillusioned, wary, and skeptical of every new antenna technology claim to hit the marketplace. In short, once bitten, twice shy.

We now, as consumers, demand proof of an antenna’s claimed performance more than ever before. We are not only more skeptical and wary, but are more sophisticated, having mastered PC versions of antenna modeling software, read online articles on everything from displacement current to Poynting Vector Synthesis, and frequenting resources like *antenneX* and online discussion forums. What inventor, in their right mind, would want to face a crowd like that unprepared? And that, I think, is where the problem is.

To be “prepared” to bring a new technology to market in a serious manner, an inventor must deal with acquiring independent, third party proof of performance data for their antenna. The calibrated instruments and reference antennas needed to do this work without the assistance and credibility of a professional engineering firm to guide them, inexperience and unfamiliarity with accepted testing protocols, acquisition of a suitable antenna test site without possibility of re-radiation or other anomalies that could potentially skew the results and compromise the credibility of the data, as well as the logistics of carrying these tests out on your own time and budget, are daunting.

Daunting, but necessary—and expensive. Given the past five years' history with the claims-to-measured-performance ratios of each new antenna technology introduced, we antenna consumers will accept nothing short of complete credibility from a new antenna technology, and that carries a price tag that is well beyond the means of mere mortals, let alone passionate inventors.

INSIST ON PROOF

To do a full battery of tests on a candidate antenna to meet industry and governmental requirements, under the control of a professional engineering company, will ultimately run into tens, if not hundreds, of thousands of dollars. Even a limited range of tests used to collect "proof of concept" data will cost several thousand dollars, if you are dealing with an internationally credible company.

And, I believe this is the level of credibility a new antenna technology must demonstrate to survive and thrive in today’s marketplace. Given all of that, I am not surprised the pace of new antenna arrivals has slowed to a crawl. Note that I didn’t mention proof of *high* performance; I only stated that whatever level of performance the antenna claims to demonstrate needs to be justified in the minds of antenna consumers through solid performance data. The greater the claims, though, the higher the quality of proof required to gain credibility.

Not that I think any of this is a bad thing! To the contrary, I think it is a very good thing; nothing chases cockroaches away faster than light, and the huge, critical spotlight we antenna consumers now cast on new products will only have the most qualified of inventions and inventors filling it. Good for us, in getting better at keeping away those that would take our money and offer us poorly performing products in return.

Of course this places an enormous burden on inventors, typically cash-poor and idea-rich, but it is the reality of the times. All of that, and you still have to convince people that the antenna works as advertised, and they still have to spend their hard-earned money to buy it, having heard about it from a well-crafted marketing plan and well-placed advertising, both also requiring substantial financial commitments. And, I won’t elaborate on what legal and other professional fees might be needed to bring the new antenna technology to “life”, protected from copycats, etc. Suffice it to say, these things are costly too.

POSSIBLE AND PROBABLE

Can it be done? Absolutely. Will it take time, effort, and money? Without question—and, if you build it, will they come? Yes... no doubt. The allure and magic of a one-foot long, high efficiency, 160-meter antenna will continue to draw us to inspect each new antenna's claim until such an antenna finally exists. And, we know that someday it will – and that's what keeps us plugging along, isn't it? **–30-**

BRIEF BIOGRAPHY OF THE AUTHOR

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