The Other ARC Repeater System

This month, I thought we'd get off topic a little bit and discuss not D-Star, but the Atlanta Radio Club's FM repeater system. This is, in part, a response to Jorge Luis, KI4SGU's article in last months Atlanta Ham. JL brought up some important points and it's good to have this kind of discussion even if the news isn't always good.

JL's concern was that the Atlanta Radio Club's primary FM repeater system is having enough technical problems that its usable range and therefore its utility are greatly reduced. He compares the ARC's146.82 machine at the Bank of America tower to its neighbor, the MATPARC 145.41 machine on the AT&T building. Both repeaters are in downtown Atlanta on two of the tallest buildings in the Southeast.

It seems a logical conclusion that both machines should have similar coverage. There are, however, difference in the sites that are worthy of note. The Bank of America tower is, of course, a taller building although both buildings are tall enough that if excellent repeater coverage is not forthcoming, there's got to be an explanation other than height.

The BOA tower is a great looking building, but sadly, it does have some complications. It turns out that the steel members in the superstructure on top are spaced just right to absorb a great deal of 2 meter RF. While ARC has multiple receive antennas inside the superstructure, none of them does a great job because of the attenuation. In fact, that's why there are so many. One just wouldn't do the trick. And because there are multiple receivers and antennas, there has to be a fairly sophisticated voting system to select the best signal. That adds significant complexity and additional points of failure to the system.

The transmitter uses a single antenna in the cone near the top of the superstructure. One of the most difficult problems with it is the fact that there are 5 other repeaters within a hundred miles using a transmit frequency within 15 KC of 146.82. We have to avoid interference with those other repeaters yet, when band conditions open or they aren't careful about their signal, sometimes we get interference from them. This places a limit on the amount of ERP we can use. MATPARC does not have these limitations. There are no other repeaters within 100 miles which transmit within 15 KC of 145.41 and the top of the AT&T Building is completely open.

In spite of these limitations, the ARC's main 2 meter FM repeater has had much better coverage in the past. This repeater is very well designed and implemented. When it was first put into service, it was clearly one of the best repeaters in the Southeastern U.S. The original team of Penn McClatchey, K4PE, Mike Kageorge, KD4EHM and Robin Cutshaw, AA4RC did an excellent job. (These three are the main ones I know about. My apologies if I left somebody out.) Not only did they put together some of the best equipment commercially available, they also designed and built pieces that were not available off the shelf and integrated everything into a one smoothly operating system.

That was about 10 years ago. Today, there's a new team taking the baton. With Chris Fowler, K3DC at the helm, and others such as Harold Hawkins, KD8DVY, Billy Christensen, KI4KGK and myself (with Robin on D-Star and Penn still helping out when he can), we have some big shoes to fill.

As the system begins to show its age, we are learning the existing system, repairing and replacing parts and making plans for expanding capabilities. Over the past year, we've had to deal with completely loosing the Gwinnett remote receive site, loosing the link receiver for the Sweat Mountain site, loosing one of the feed lines at the Bank tower and most recently loosing the once repaired link from Sweat Mountain again and now loosing a good bit of output power on the transmitter.

Because the main site has such receive problems, we have really depended on our remote receivers. Last April, Gwinnett County decided to stop using their water towers just off of I-85 near Jimmy Carter Blvd. ARC had a remote receiver on one of those water towers. When the county shut off power to the site, we were off the air. We've been looking for another Gwinnett site and have several candidates, but, as of yet, nothing that we can actually use.

Even more important than Gwinnett though, is the Sweat Mountain site. It has a tremendous view of the entire metro area including Cobb, Gwinnett and even downtown and points south. With such tremendous coverage, it makes up for the lousy reception at the Bank tower. It really hurt when it started getting flakey last spring. After considerable diagnostic effort involving many people, we finally determined that the problem was in the link receiver at the main site. It was replaced with the, now spare receiver that had been used for Gwinnett. Everything worked fine for a few months.

In December, at the Bank tower, the feed line for one of the antennas that was used for both the main receiver and the 2 meter D-Star machine had to be repaired. In the last few months, the footprint of the system has been greatly reduced because of the loss of the link from Sweat again and from a reduction in output power. On January 30th, that link problem was fixed and we removed the output power amplifier to diagnose problems with it. Testing revealed that the PA is fine so now we'll have to look at the Vertex transmitter itself.

Currently, the status of the whole system is that everything is working except for reduced output power and we are still looking for a Gwinnett site. The equipment for the new Gwinnett site is ready to install and with any luck we'll have the output power back to normal within another week or two.

Longer term, we're looking at the possibility of adding remote receive sites in other areas that are not well covered and updating the whole system with new, more reliable equipment.

As always, direct questions, comments and suggestions to KE4FOV@Bruner.us.