Natural Radio

News, Comments and Letters About Natural Radio

October 2003

This was the weekend of *Radio Expo* which is the largest hamfest of the year here in Northern Illinois. Although the size of the hamfest had shrunk by about a third from what it was four or five years ago, interestingly there were only a few computer dealers and there seemed to be more ham equipment for sale than I remembered in a long time. I found some good deals on components – some MMIC amplifiers and mini-circuits balanced mixers.

I have yet to see anything even remotely related to Natural Radio at a hamfest. There were a couple of old LF shipboard receivers – one RCA unit even had a regeneration control, but I didn't feel like acquiring any more boat anchors. I was hoping to find a good quality LF signal generator with modulation capabilities but didn't. Chicago hamfests tend to be dominated by VHF & UHF gear, no doubt because of Motorola's presence here and the abundance of surplus equipment from them.

There have been some good conditions for Natural Radio listening lately and probably will be for a while. Since we are on the declining end of the solar activity cycle we are near the peak of coronal hole activity. Coronal holes have open magnetic field lines and dispatch high speed streams of solar wind. A favorably positioned hole (with the stream directed earthward) can cause geomagnetic storming on earth. Such was the case last Wednesday, September 17, when the high-speed solar wind stream raised the Planetary K-index to 7. I went out that morning on my way to work and recorded some very loud riser-like discrete emissions.

Coronal holes tend to reappear at 27 day intervals which of course are the rotational period of the sun. During periods of high solar activity, coronal holes can appear anywhere on the solar disk; but at the solar minimum, coronal holes tend to be confined to the polar areas of the sun.

If you have a chance to get out in the next few weeks, listening should be good. The thunderstorm activity is quieting down, sunrise is happening later which means you don't have to get up at a ridiculous hour to catch a time of good activity; and geomagnetic activity should be high because of coronal holes. So take your receiver out and enjoy the brisk fall air.

Flares from beyond the Solar System - I received an interesting news article from NASA last week concerning flares that come from far out in the galaxy. On August 27, 1998, several days after the earth was hit by the effects of an X-class solar flare, another blast wave slammed into the ionosphere, but this one didn't come from the sun.

"The source of the blast was SGR 1900+14, a neutron star about 45,000 light years away," says NASA astronomer Pete Woods. "It was the strongest burst of cosmic x-rays and gamma rays we've ever recorded."

The source of this radiation was a special type of neutron star called a magnetar. Magnetars have the strongest magnetic fields in the universe – on the order of 10^{15} gauss. Compare that to the magnetic field of the sun which is about 10 gauss in most areas and 1000 gauss in the vicinity of sunspots.

Unlike radio blackouts from solar flares that always hit on the day side of the planet, this one occurred during the night.

Since 1998, Professor Umran Inan head of the VLF Research Group at Stanford University in California and his group have recorded at least 10 such extra-solar ionization events. Five of these events were from the above mentioned magnetar SGR 1900+14, but the rest were from unknown sources – probably yet undiscovered magnetars. The VLF group has a network of receivers that monitor the VLF Navy stations such as NPM in Hawaii and look for sudden dips in signal strength that are the telltale signs of sudden ionization of the ionosphere.

Finding the magnetars is accomplished by using data from a variety of spacecraft that carry x-ray or gamma ray detectors. By noting the arrival time differences at each of the satellites, the location of the burst can be determined by simple triangulation. Currently, there are only ten or so known magnetars in the Milky Way. For more information, you can read the article in its entirety on the NASA news site at http://science.nasa.gov/headlines/y2003/12sep_magnetars.htm?list95335.

Incidentally, this article came from a Science News Update that I receive from NASA. To sign up for this service, go to http://science.nasa.gov/default.htm. This is a very good service that will keep you updated on many space science topics.

Alerts for Space Weather Events - While we're on the topic of being aware of what's going on with space weather, you can receive alerts via alphanumeric pager, fax or email for space weather events from the Space Environment Center at http://www.sec.noaa.gov/alerts/register.html#form. If you are a member of the VLF_group on Yahoo, the reports are published to that list as events occur.

If you want to be notified by telephone when significant events are occurring, subscribe to NASA's Spaceweather Phone at http://spaceweatherphone.com/. You will receive a recorded message from NASA's Dr. Tony Phillips when a significant event occurs.

You can choose from Space Weather Alerts and Backyard Astronomy Alerts or both. You can also specify times for the calls including 24 hour service. (If you'd like to be awakened with a 3 AM call for a sudden aurora display.) There is a monthly charge for this service.