Natural Radio

News, Comments and Letters About Natural Radio

June 2002

I just returned from my annual trip to the Dayton Hamvention. It was not a pleasant weekend for an outdoor fleamarket, with cold weather and a light drizzle on Friday, and cold weather and partly cloudy on Saturday. There was nothing visible related to Longwave radio, I had expected with the proposed licensing for a 136 kHz band in the US that a few small manufacturers might start establishing a presence at the show, but no. I purchased a couple of cast aluminum project boxes and some varicap diodes for that remote tuned loop I've been planning, but saw nothing else related to VLF.

My schedule hasn't allowed much time for morning listening sessions this Spring, but I've been doing some midnight listening with the Kiwa receiver lent to me by Jon Wallace and found that with the two piece construction of the receiver, my cat can rub against my leg all he wants without causing any static in the phones. Amazing, this new technology! Nevertheless, there has been almost no activity here in the evening – the tweeks aren't even very strong.

There seems to be something about my home location that absorbs Natural Radio signals. Has anyone ever done any studies on the effect of low-lying areas or atmospheric moisture on E-Field signals? There is of course, anecdotal evidence of trees causing poor reception, but I wonder if this has ever been studied and quantified? It might be interesting to do coordinated monitoring in different types of locations within a few miles radius to see if there are local effects that effect reception.

I have done further experimentation with the Roland SN-550 noise reduction unit, and found that the artifacts it creates in removing the large amount of hum and buzz at my home location makes it not really desirable for this type of listening. There are many high frequency components in the power line noise in my neighborhood, possibly from solid-state fluorescent ballasts, that are in the passband of desirable signals. I may try further experimentation with a loop rather than an E-Field receiver.

Summer Coordinated Monitoring If anyone has any interest in a coordinated monitoring weekend this summer, let me know via E-Mail or US Mail if you don't have Internet access. Rather than picking a weekend at random I'll try to pick one that meets the desires of those interested**.**

Popularizing Space Weather. Space weather seems to be making more appearances in the media lately. As I often do as I retire for the evening, I tuned in to Art Bell's *Coast-To-Coast* last week and heard an interview with Dr. Ramon Lopez. Dr. Lopez is the C. Sharp Cook Distinguished Professor in the Department of Physics at the University of Texas at El Paso, and co-author of the new book, *Storms From The Sun – The Emerging Science of Space Weather*. I managed to stay awake for about 30 minutes of the interview (the show comes on at midnight) and Dr. Lopez was quite

articulate. George Noorey, the interviewer, kept pushing for what would happen "if the worst possible scenario were to develop" – which is of course his job, to keep the audience listening. But, Dr. Lopez kept in control and described the effects of surge currents on the power grid, electrical damage to satellites, and the warning system that is in place with SOHO and the ACE spacecraft.

An interesting point he brought up that I had never considered is that most of the satellites we depend on for information, like SOHO, are research satellites with a fixed mission length and they will be turned off once their research mission is complete. He thought that it was important to get long-term "working" satellites into space with the objective of continuous monitoring of Space Weather.

I checked out his website the next morning and discovered that the book is written in non-technical language and seems to be a good primer for the interaction between the Sun and the Earth. I have ordered a copy and will report later if it is as interesting as it seems to be from the information on the website. The book is available from National Academy Press at http://www.nap.edu/catalog/10249.html

IMAGE Satellite Confirms Theory Behind Geomagnetic Storms. NASA issued a press release this month on some new information from the IMAGE Satellite. The IMAGE satellite (Imager for Magnetopause-to-Aurora Global Exploration) was launched in March of 2000 and is in a elliptical polar orbit that allows it to look down on the polar regions of the earth. It can view the interaction between the solar wind and the magnetosphere with a variety of instruments.

New observations reveal that the Earth's outer atmosphere acts like a heat-shield and protects the atmosphere from heating up and expanding during an onslaught of energetic particles from a space storm. The outer thin layer of the atmosphere dissipates the energy from the storm by becoming ionized and in effect burning away, in a similar manner to a spacecraft heat shield. These high energy oxygen ions that are ripped away by the solar wind are then trapped by the earth's magnetic field and form a hot plasma cloud around the earth. The earth's magnetic field lines are stretched out on the downwind or night side of the earth by the solar wind. This along with the trapped plasma forms the geomagnetic tail. The magnetic field lines are elastic, however, and eventually snap back bringing the ions with them and accelerating them to high velocities. They then follow the field lines down into the polar regions and cause an auroral display.

For many years it was believed that the solar wind itself supplied the energetic particles responsible for geomagnetic storms. Earlier space missions helped form a theory that the plasma cloud came from particles supplied from the atmosphere, but IMAGE provides the first global picture showing the active role of Earth's ionosphere in space storms.

Read about it in detail at http://www.gsfc.nasa.gov/topstory/20020509imagessu.html