ANTECEDENTES:

The Jansky Experiment - Observing the Milky Way using the Radio Jove kit.
by Jason Shinn

The galactic background is experienced through the Jove receiver as a background hissing noise that varies slowly in amplitude over 24 hours. This radio noise is produced by electrons spiraling in the Milky Way's magnetic field. It gets stronger in the direction of the galactic plane and is especially strong toward the galactic center. The Jove receiver is capable of detecting the small change in signal strength between the plane of the Milky Way, as it runs through the galactic center, and the rest of the sky.

SETTING UP THE JOVE RECIEVER

To detect the Milky Way, use a single or twin Jove dipole, the Jove Receiver, and a computer running Radio SkyPipe. Set up the Jove system as usual, with the dipole(s) running east-west. If you are in extreme northern or southern latitudes you may want to use the phasing cable to tilt the beam of the antenna in the direction of the constellation Sagittarius. The Jove receiver gain should be set between the 12 and 3 o'clock positions and the software volume control set so that the baseline trace falls between 1000 and 2000 on SkyPipe. The following SkyPipe setup is suggested for a 24 hour Milky Way scan.

SKYPIPE SETTINGS FOR A 24 HOUR GALACTIC SCAN

STEP 1 Change the samples of data per second.
This reduces the samples of data to one per second and minimize the space needed to store your scan. A higher sample rate will not allow you to share your data file on the Radio Jove archive because of the file size.
Click OPTIONS on the SkyPipe tool bar.
Select the STRIPCHART tab.
Set Sample Period ms to 1000.
Click SAVE and DONE.

STEP 2 Set the data logging time for a 24 hour scan.
Click OPTIONS on the SkyPipe tool bar.
Select the LOGGING tab.
Check the box marked "Start New Run"
Set Max Duration to 24:00 and be sure that Max Samples reads 1000000000 by default.
The Max Duration setting, in conjunction with the sample rate in step 1, will cause SkyPipe to save and restart the chart before the default max sample is reached.
Uncheck the box marked "Restart Chart at".
Click SAVE and DONE.

PLANNING YOUR OBSERVATION

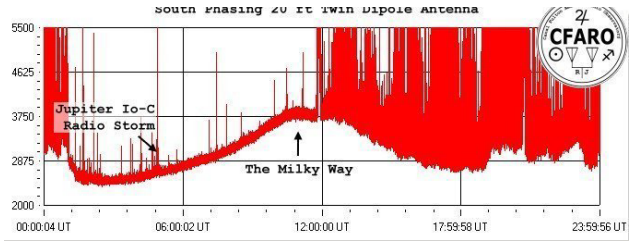
Once these settings are implemented you are ready to begin. Plan your observing day by choosing an hour to begin and making sure you can safely leave the system on for 24 hours. It is not a good idea to make a Milky Way scan if there is thunderstorm activity predicted to occur within the observation period. If you intend to repeat your Milky Way scan over the course of a year be sure to choose the same time to begin every observation. This gives you a standard by which you can trace the motion of the Milky Way as the earth revolves around the sun. Remember also to take into account the switch between daylight and standard time if necessary.

AFTER YOUR OBSERVATION

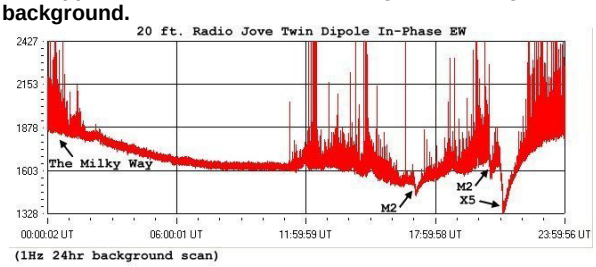
After SkyPipe has completed its 24 hour chart of the background it is time to look at your data. First begin by loading the saved data file and clicking the "show the entire file on a single screen" button. This button should be on the lower left of the view screen control buttons. It has four small arrows facing outward in four different directions. To see the "hump" in your chart data you will have to adjust the Y axis by clicking the arrow button that decreases the Y axis span. On SkyPipe this button has two vertically oriented arrows facing in toward each other. This exaggerates the Y axis data and allows the barely perceptible Milky Way hump to be seen clearly. One of the first things you notice is the striking difference between day and night on the scan. (figure 1) During night hours the baseline is very smooth with very few spikes of interference. During daylight hours the baseline is full of spikes from distant lightning and man-made interference.

OTHER USES FOR GALACTIC SCANS

Galactic background scans are also useful in detecting Jupiter and solar x-ray bursts. Strong Jupiter emissions will show up as spikes on the relatively smooth background during night hours. (figure 1) During the day solar x-ray bursts can ionize the ionosphere more than usual and cause it to absorb the Milky Way's radio emission.(figure 2) We call this phenomenon Sudden Ionospheric Disturbances or SID. These show up as sudden dips in the chart during daylight hours.



Night and Day, the Milky Way, and Jupiter. The plane of the Milky Way can be clearly seen to transit the telescope locally near 11:00 UT during March. Transit times in UT will vary depend on the longitude of the observer's local time zone relative to the longitude of the UT time zone. Jupiter also appears as an Io-C radio storm against the nighttime background.



Sudden Ionospheric Disturbances. Multiple SID events are evident as they cut deep into the Milky Way's radio noise. In this figure the SIDs are designated by the class M and X solar flares that produced them. Compare figure 2 to figure 1. Notice that the local transit of the Milky Way over the CFARO telescope is now near 00:00 UT during September. Transit times in UT will vary depending on the longitude of the observer's local time zone relative to the longitude of the UT time zone.

LA EXPERIENCIA:

Utilizando el mismo equipo con una antena dipolo resonante, se obtuvieron resultados semejantes. Ya que el equipo se encontraba en una zona muy urbanizada, se registraron muchas interferencias radiales, pero so observó claramente la señal del centro galáctico.

EQUIPO