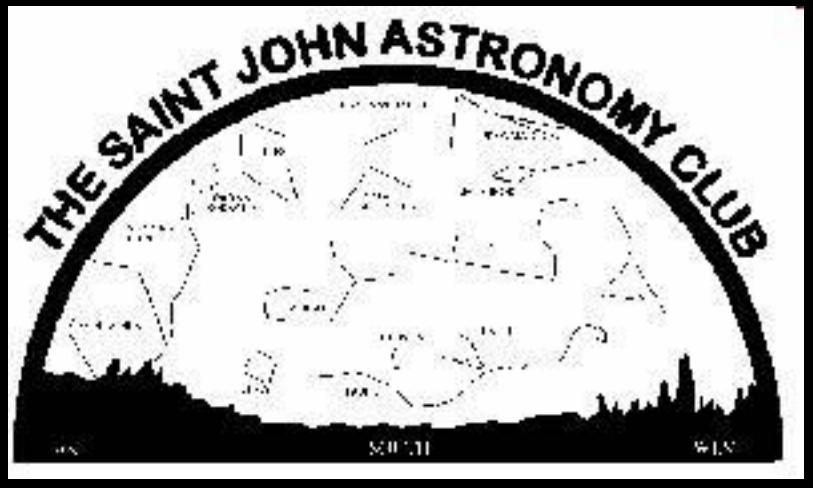
# Welcome

**Saint John**
**Astronomy Club**

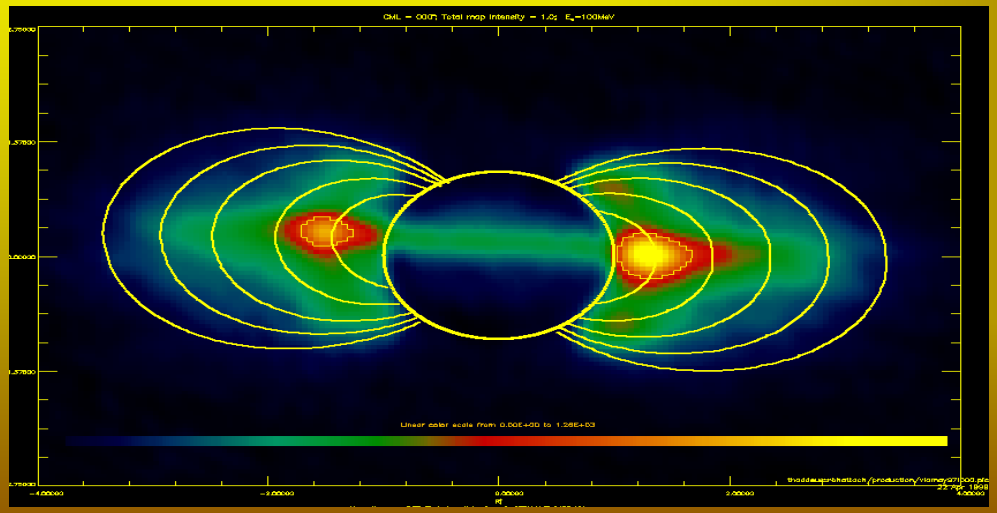


# Listening to Jupiter


By Mike Powell

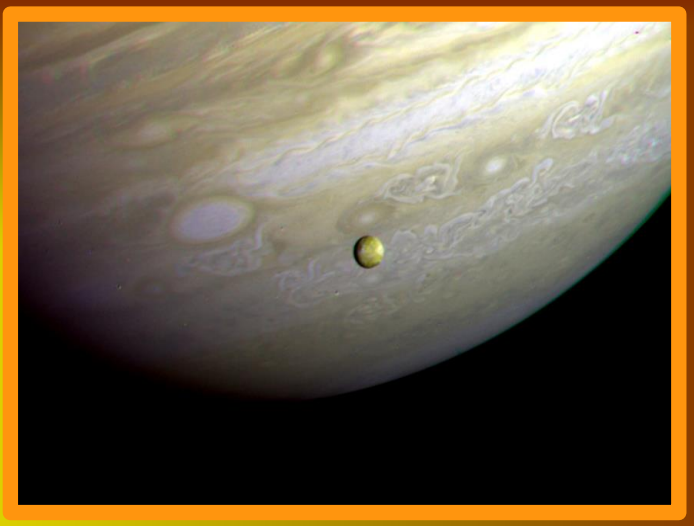
# What your listening to

Jupiter is a source of powerful bursts of natural radio waves that can produce exotic sounds when picked up using Ham or Shortwave receivers.



Radio Image of Jupiter

# How it happens

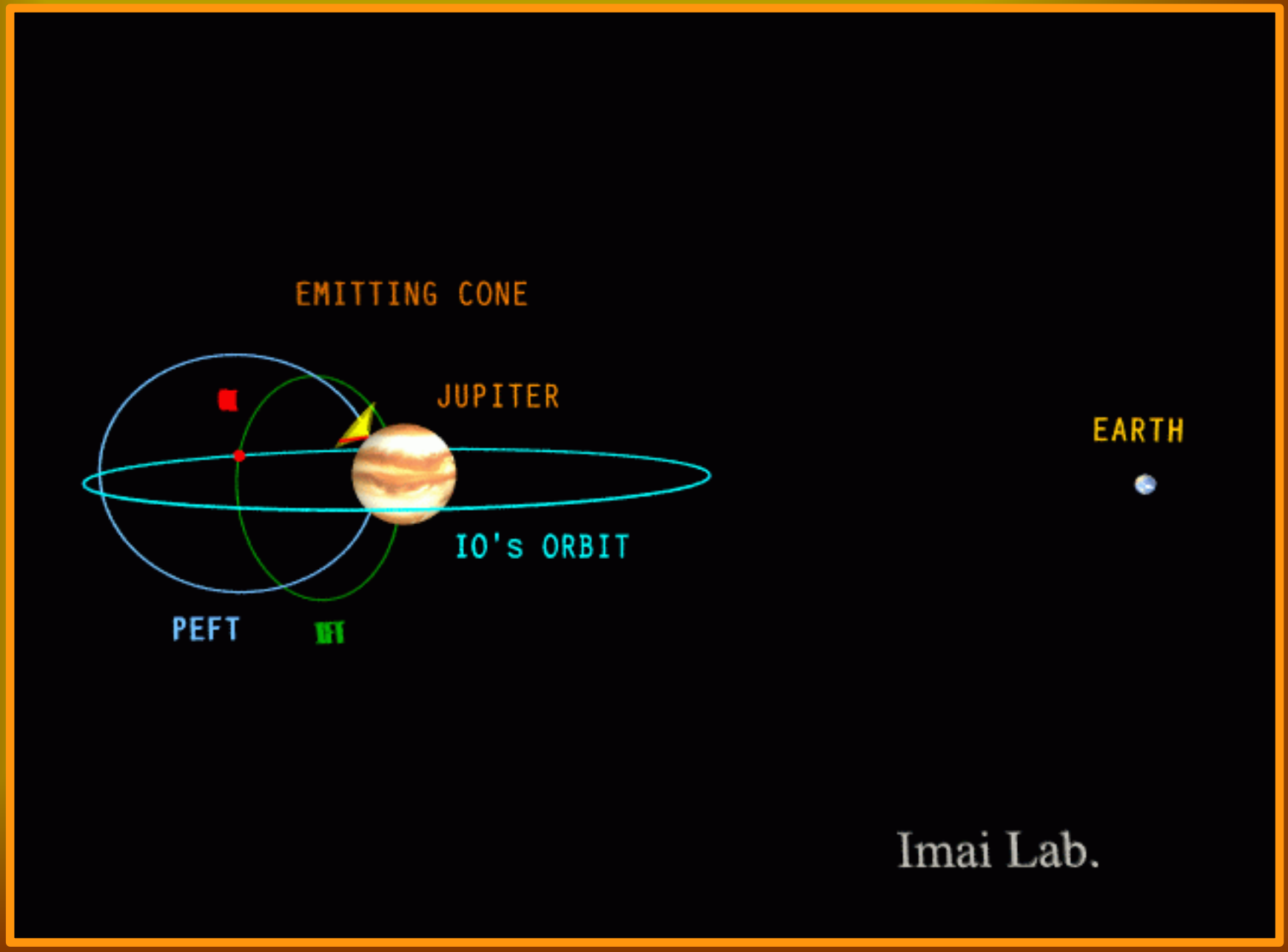


- Where does the radio signal get so much power?
- It starts with Jupiter's volcanic moon Io.
- Tidal forces from Jupiter and its other large satellites superheat the interior of the moon Io and make it the most volcanic body in the Solar System.
- Volcanic materials are thrown far above Io's surface. Much of that enters orbit around Jupiter, forming a huge gaseous donut around the giant planet.
- With a diameter the size of Io's orbit, the electrically conducting "Io torus," as it's known, spans 525,000 miles and has an important impact on Jupiter's magnetic environment.

# Two Trillion watts !!!

- As Io's orbital motion carries it through this magnetized ring of ionized gas, a huge electrical current flows between Io and Jupiter. Carrying about two trillion watts of power, it's the biggest DC electrical circuit in the Solar System.
- This current is the power source for plasma waves that gives rise to the radio signals that travel away from Jupiter's magnetic poles in cone-shaped beams.
- The beams rotate with the giant planet every 9 hours and 55 minutes making Jupiter something like a slow-turning pulsar. When the beams sweep past our planet Earth, listeners here can pick up the Jovian radio bursts in the radio bands between 15 MHz and 40 MHz.

# RADIO CONE



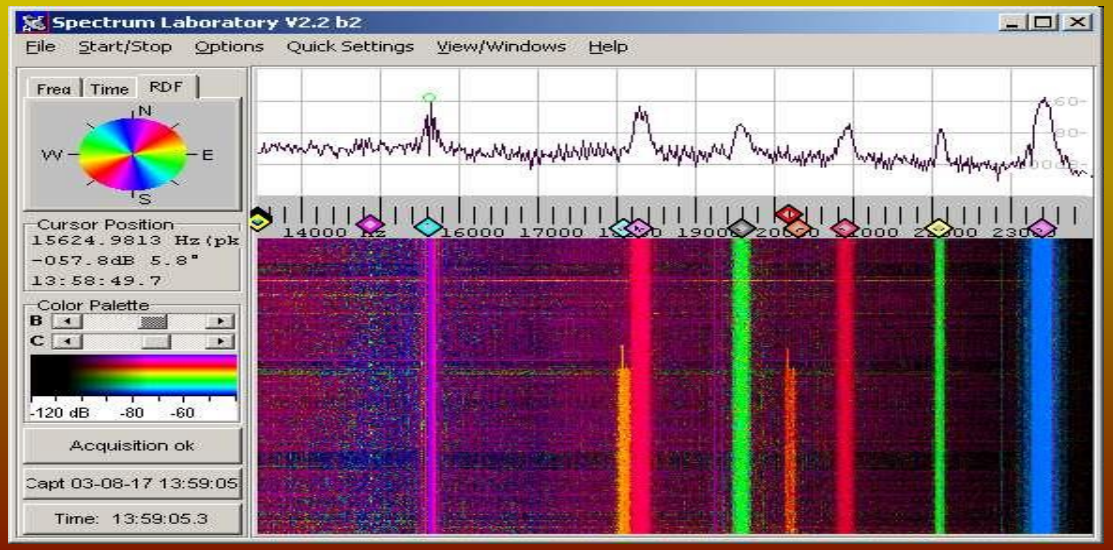
# What you need to Listen

## Radio – Ham or Shortwave – 15MHz – 40 MHz

Ham Radio Setup

Shortwave Radio Setup


## Spectrum Analyzer Software



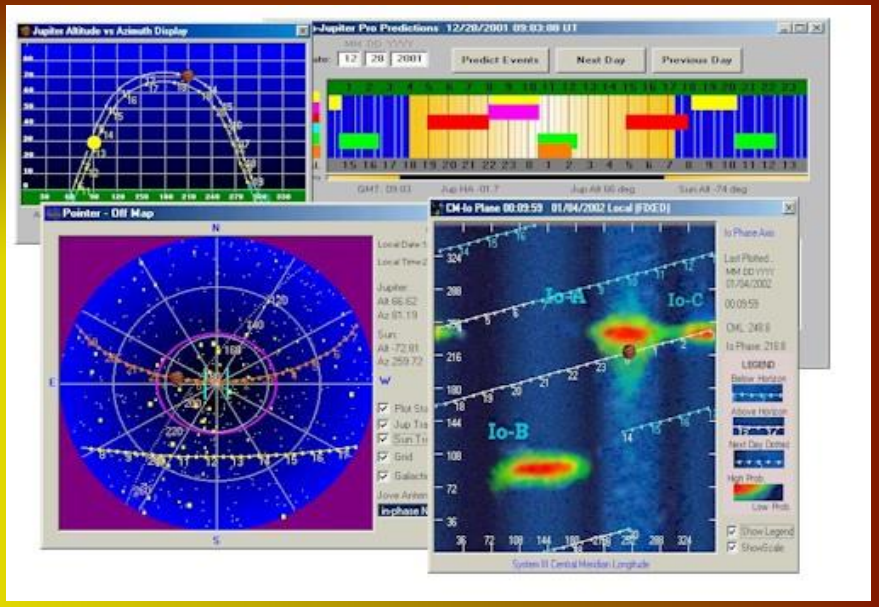
# Continued

Sky Charting Software
To know when Jupiter is in the sky and can be listened to.

(Starry Night Pro Plus 6)

Specialized Software for Predictions

# Radio-Jupiter Pro 3




- Predictions and positional information customized to your location.
- Customizable prediction reports simplify long range planning.
- See when Jupiter season is coming with the yearly visibility chart.
- Real time sky map helps you see where Jupiter is in your antenna beam. Plots the Sun, stars, and even the galactic plane.
- Io-Phase chart allows you to visualize and follow Jupiter through high probability areas.
- Observer log with Quick Log feature simplifies observation records with timestamps, position info, and one click burst notation.
- Chart the Jovicentric declination of the Earth.

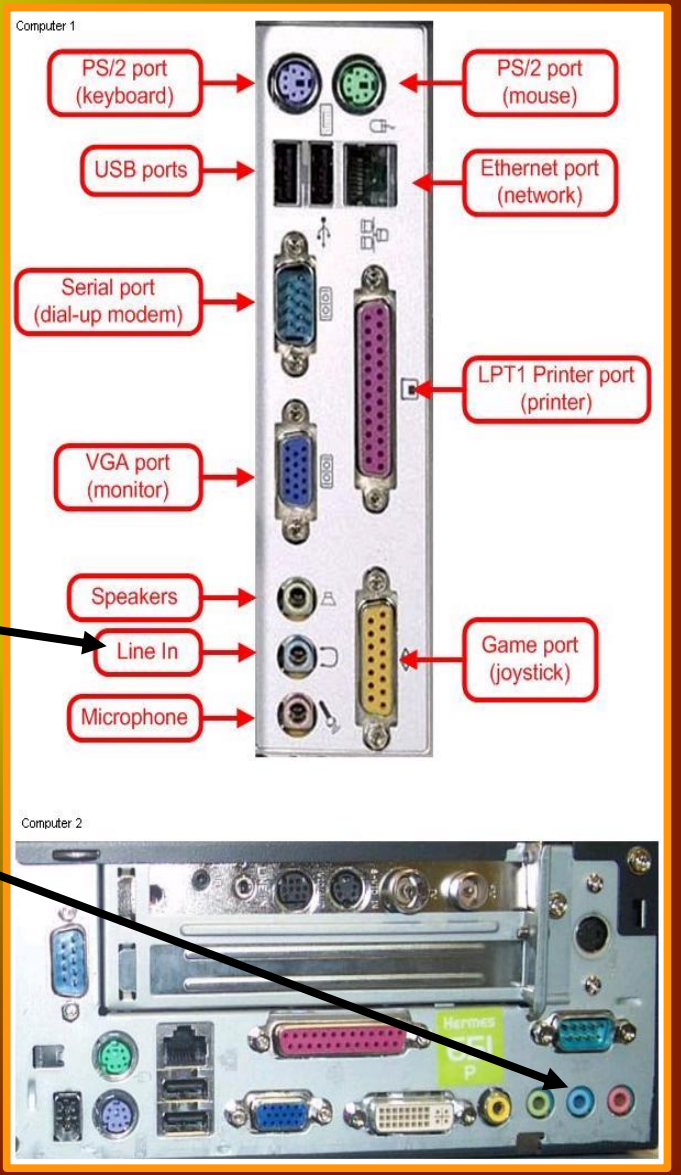
Only

$19.95 USD

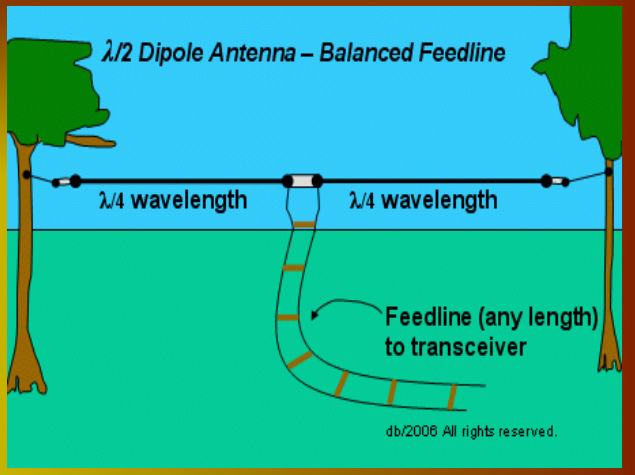
# How to Connect


Ham or Shortwave Radio

Simply connect Radio “Speaker out” to Computer “Sound card Line in”. Spectrum Analyzer Software will recognize input.

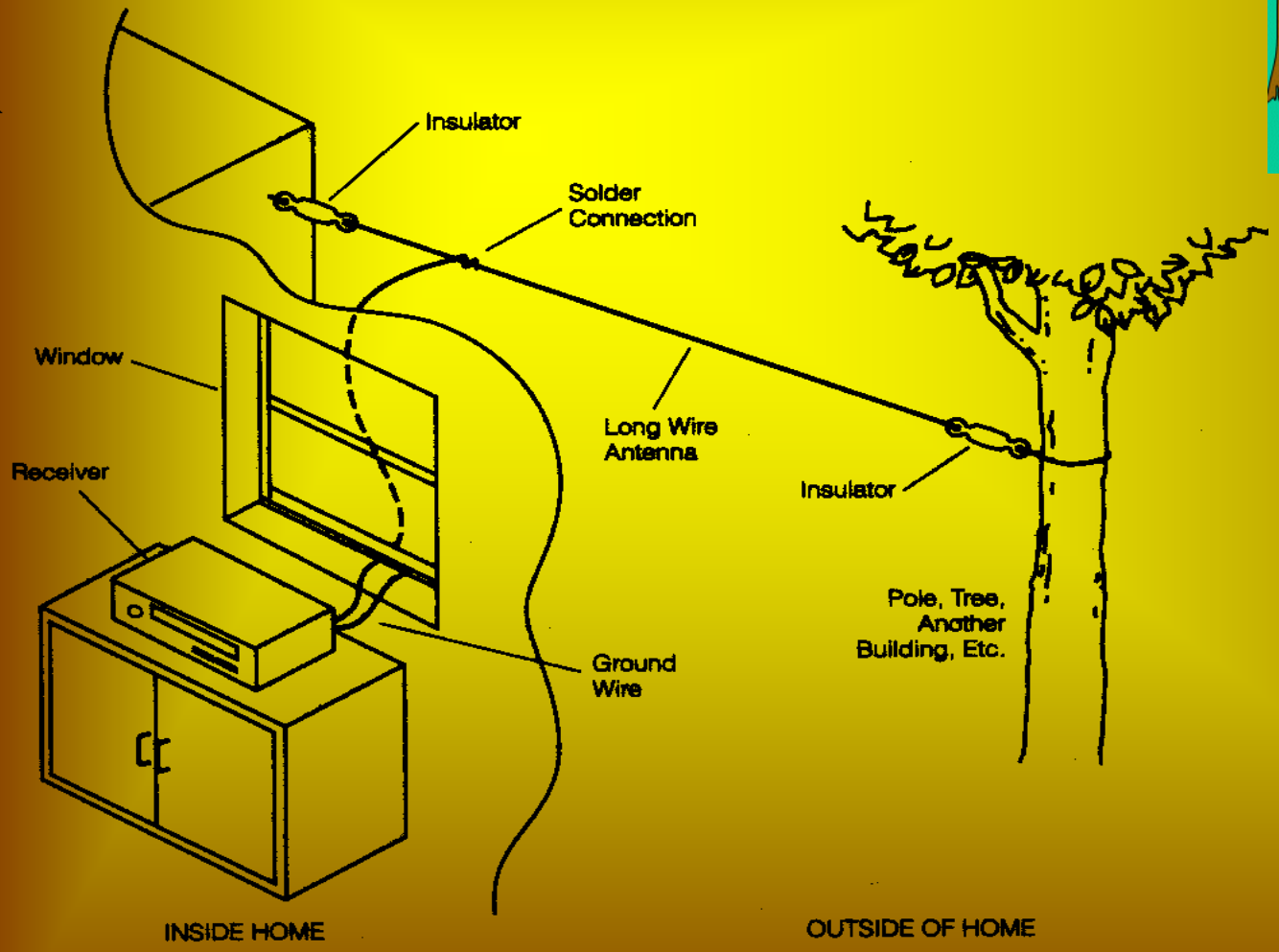


# The Antenna



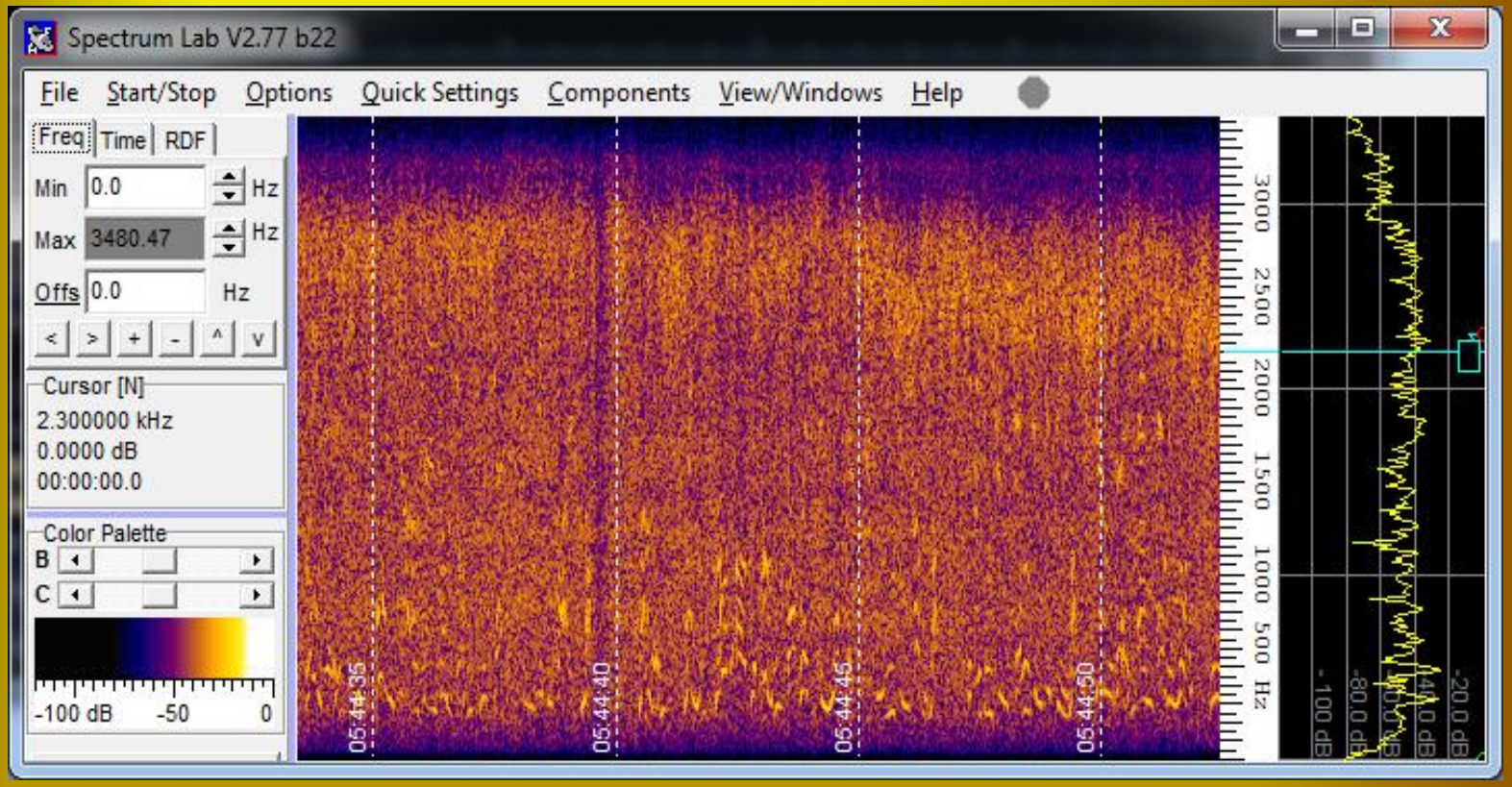

Simple Dipole Antenna

**Figure 11-1. Typical Long Wire Installation**



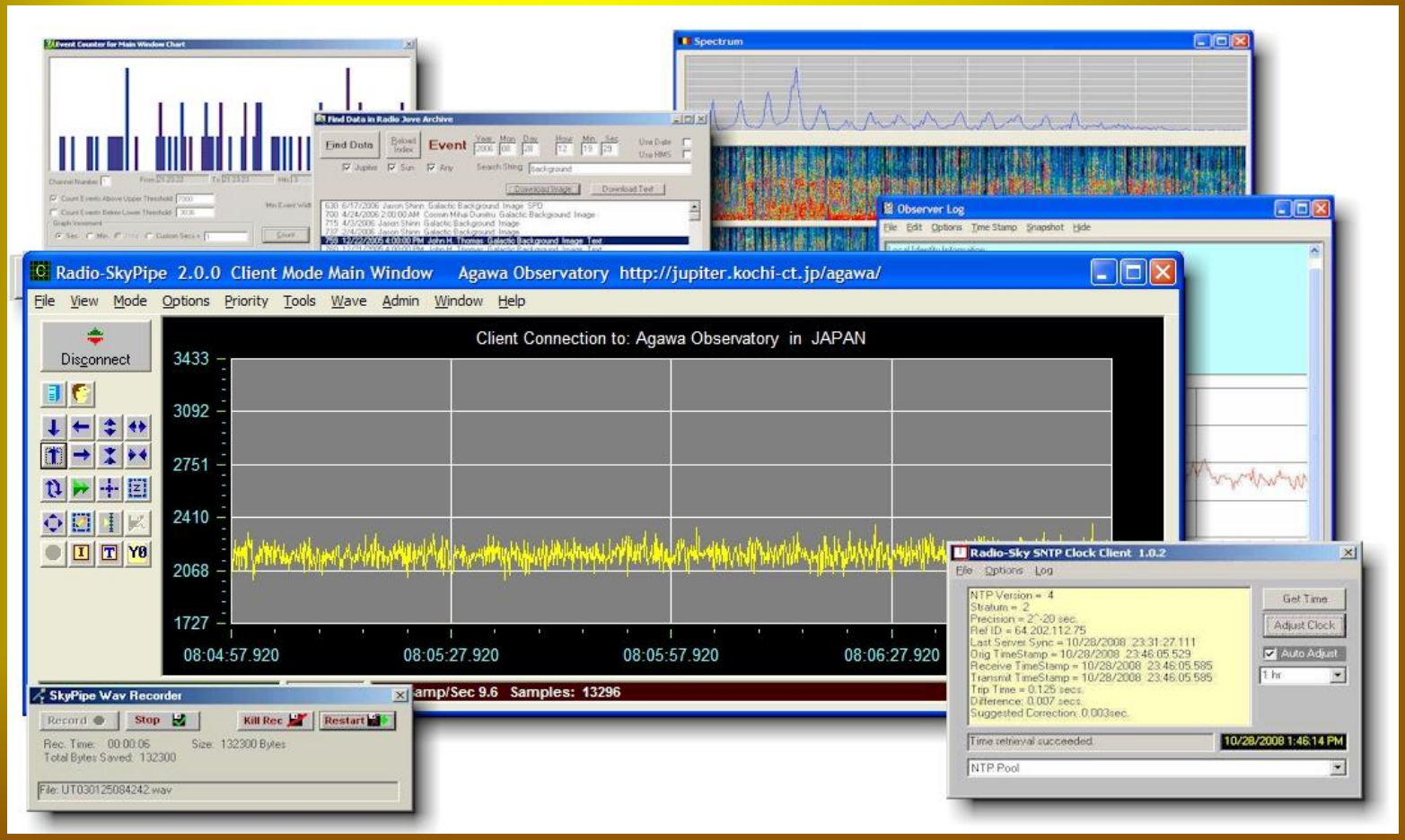

Best to Run Antenna East / West

# Spectrum Analyzer Software




Spectrum Lab analyzer software will give a visual representation of the signal given off by Jupiter.  This can be recorded for future reference.

# Radio-SkyPipe II



# Picking a Frequency

Pick a frequency between 18 MHz and 28 MHz for the greatest likelihood of success.

Then all you need is “Patience”. Listen for a change in Static.

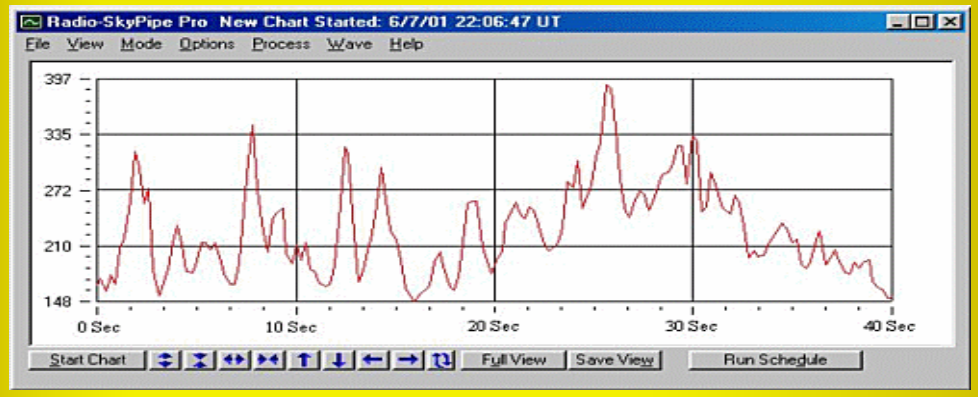
# My Ham Radio Setup

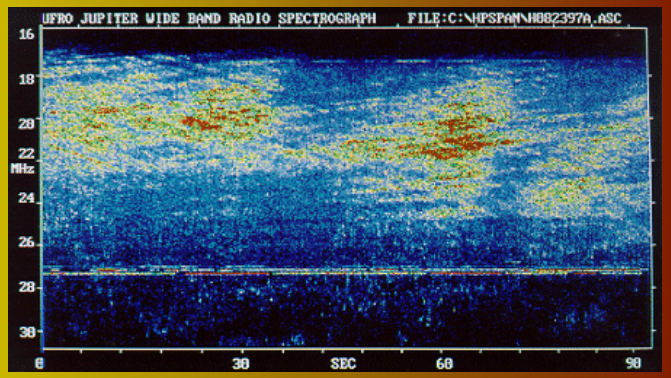
# What to Listen for.

## 2 common types

The “L” Burst

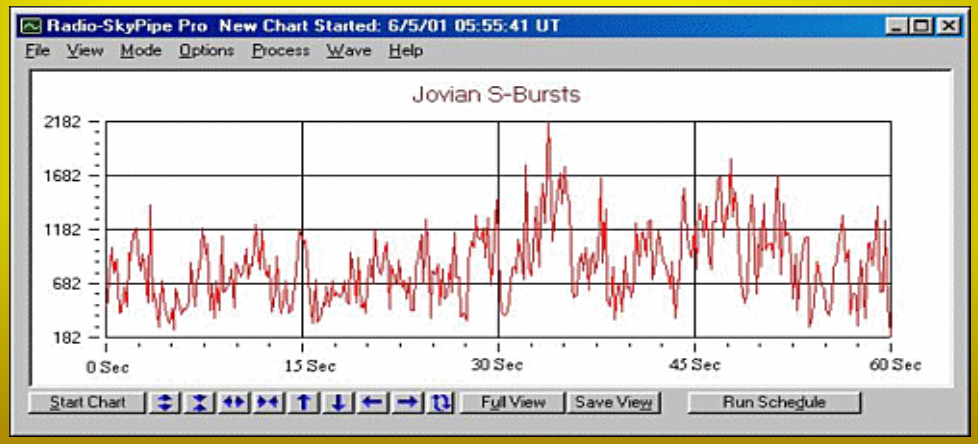
“Waves on the Beach”

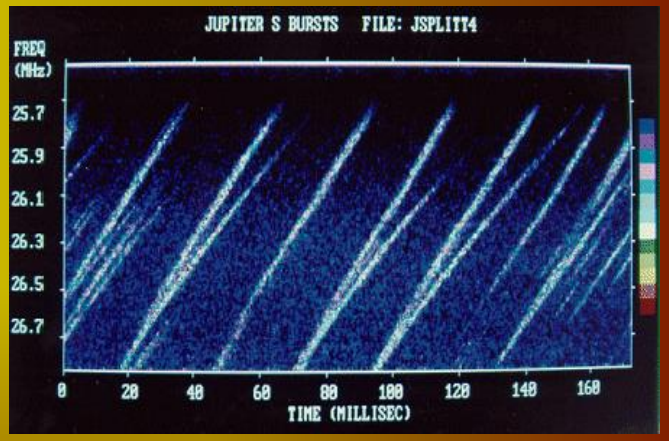


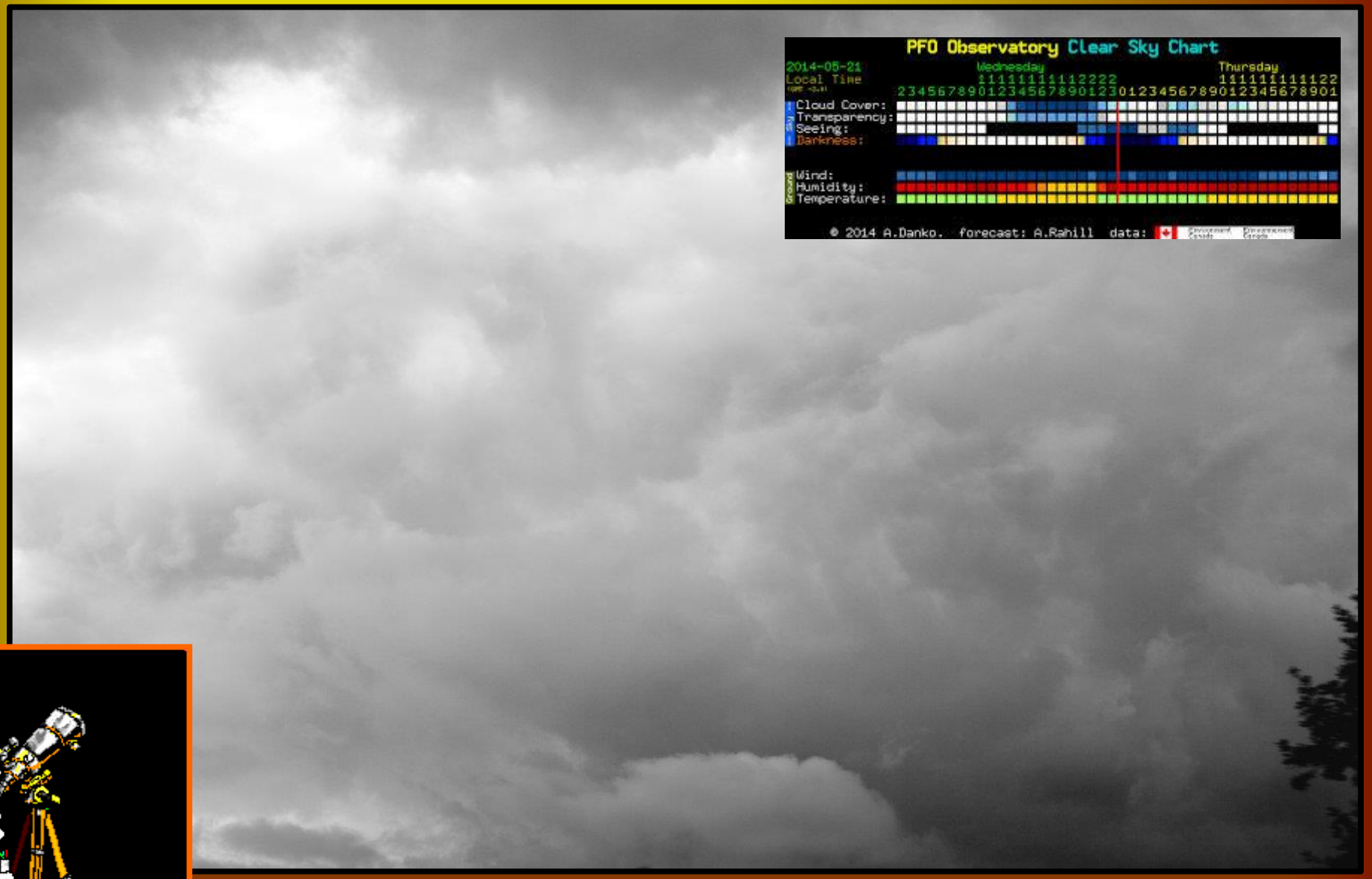

The “S” Burst

“Swirls”



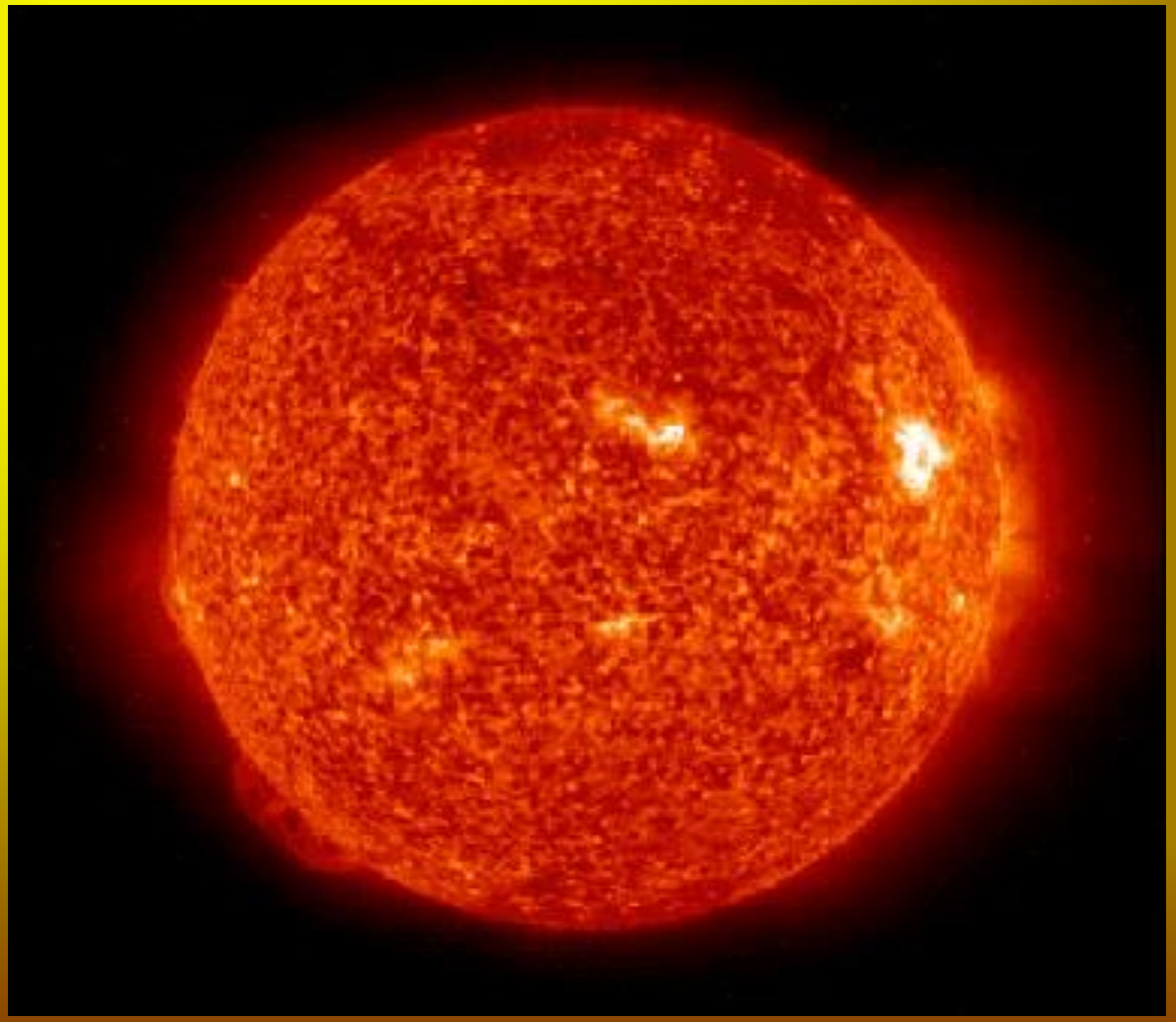



# Remember --- When it's Cloudy




# Jupiter – Can Still be Heard!!! Day and Night

# Same setup can be used for Listening to the SUN



# THE END


PFO
Observatory


WARNING
The last person that touched my telescope is in my backyard!