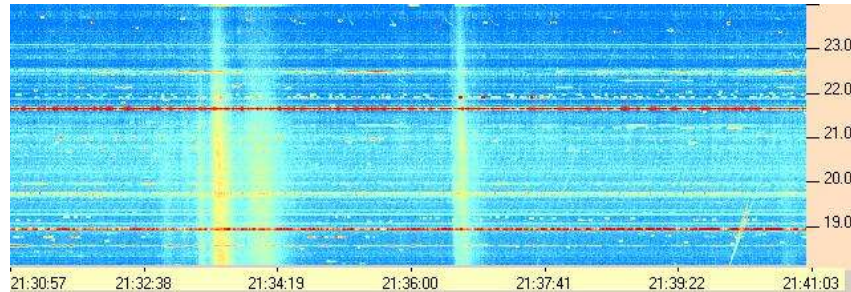


What is the Best Time of Day to Listen for Solar Bursts? Richard Flagg (WCCRO)

Over the years I've heard quite a few solar bursts. It seemed like most of them occurred in the morning hours. I decided to check and see if that perception was correct.

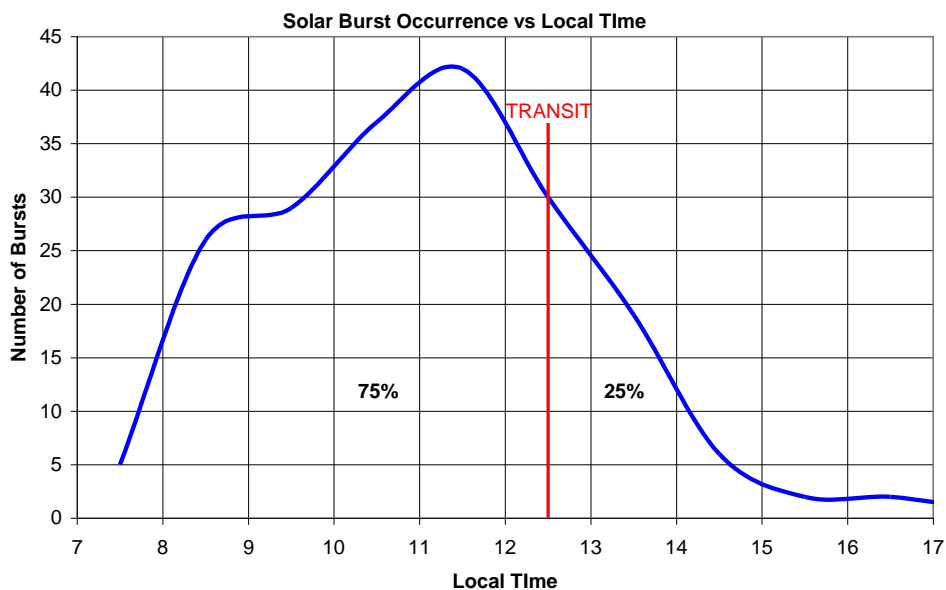
Radio spectrogram images are saved every 10 minutes at Windward Community College Radio Observatory (WCCRO).



The antenna is an 18-30 MHz log-periodic aimed due south at a high elevation angle. Since the antenna is aimed due south it should not favor morning or afternoon activity.

Every spectrograph image from August 1 thru September 11, 2011 was analyzed to determine which images contained solar activity (over 3000 daytime spectrograph images). If there was any solar activity in the 10 minute long spectrogram then the time of the image was noted. These times were then sorted into hour long bins, representing local time. For example the spectrogram above would carry a count of 1 event and be placed in the bin for 11-12 Hawaii Standard Time. (Hawaii is 10 hours behind UTC).

Two hundred spectrograms were found to contain solar bursts. The following plot shows the occurrence of those bursts with local time.



At this time of year solar transit occurs near 12:30 HST. From the above plot we see that approximately 75% of the spectrograms containing solar bursts were recorded before solar transit while only 25% occurred after.

Why aren't bursts as frequent in the afternoon as in the morning? The cause is likely the Earth's ionosphere. The ionosphere starts out relatively transparent at dawn and becomes increasingly opaque during the day. The increase in opacity causes increased absorption and refraction. In the morning hours the solar bursts pass thru the ionosphere with relative ease, but as the day wears on the opacity increases and refraction of some solar signals back out into space increases. Those bursts that are not refracted completely suffer increased attenuation passing thru the thicker ionosphere.

In summary it appears that solar activity is most likely to be received in the late morning, at least with an antenna whose broad beaming pattern is centered on solar transit.