Leon Darcy recently moved to the southern New South Wales area of Goulburn from his long time home in western Sydney. He has been working on the observatory project now for the past ten years and a recent purchase of a large property at Bungonia by his friends Greg and Judy meant that Leon could realize his dream of re-assembling his radio observatory in the relative quiet of a country setting.

Dr. Ragbir Bhathal, who is an accomplished science author with several important books on astronomy and a lecturer at the University of Western Macarthur, west of Sydney has been helping Leon with this project and as the pictures shows, he is pretty good on the shovel as well as the telescope.

Leon has designed and manufactured a photon counter detector array for the Optical Seti project being conducted at the University. The 16" (inch) telescope is located west of Sydney at the University and another unit similar to this will eventually located at the Bungonia Observatory. The detector is now being used by the astronomy group as part of their on going Seti Project.

**It is important to note that Leon's project and the one at the UWS are not connected. They are completely separate projects.**

The two 7 Metre dishes he has moved to the site, used to part of the Criss Cross radio telescope at Badgerys Creek west of Sydney. The site was constructed during the 1950's and used up until the mid eighties by the University of Sydney. Visit http://www.treasure-troves.com/bios/Mills.html for more information of this historic site.

Leon has worked very hard to get his project off the ground. Alex Hamill, Greg and Judy and Dr. Bhathal have all contributed to this amazing project.

The picture shows the newly erected radio interferometer at Bungonia N.S.W. this instrument is spaced 52 metres apart, or 248 wavelengths

at the frequency of neutral hydrogen 21cms. The telescope is capable of doing professional standard radio astronomy as well as acquiring data for our Microwave Seti project.

Should any candidate signal be received then each dish can operate as a single receiver so testing of the signal can be done without relying on another station, if the same signal appears at both antennas then we are not just monitoring a noisy bug in our receiving equipment.

The resolution of distant stars is very important in radio astronomy and SETI, this interferometer has a angular resolution to 2 arc minutes, not as good as optical telescopes with a main mirror of 6 inches, but good enough to narrow the field and find the suspect star and eventually identify the source of any suspect signal.

The front-end amplifiers are homemade and come from a SETI League design using the Hewlett Packard GaAs MMIC chip. The second stage amplification and filtering is achieved by again using a SETI League designed "amplifilter" unit, one for each dish, the signal is then further filtered using 2 (two) cavity filters.

The back end main tuners and receivers are donated microwave equipment, refurbished and retuned, by SETI League members Mr. Neil Boucher and Noel Welstead in Queensland (web site www.seti.org.au )

The final FFT (Fast Fourier Transform) and signal processing will be done by a rack of Pentium computers with a custom designed DSP. that will allow 3 million channels per second to be analyzed.

“We still have a little way to go with the final design, but it’s coming on nicely,” said Leon.

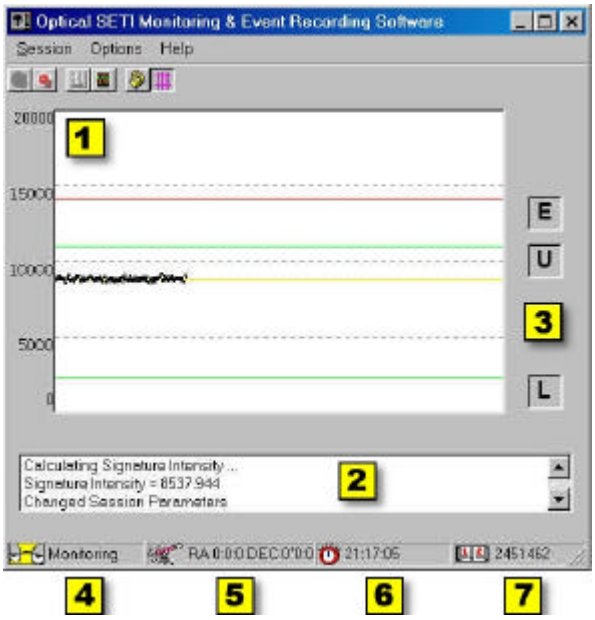
## Data for Optical Observatory

Abstract

When a high-energy laser pulse is generated, the very hot excited photons form a coherent beam of radiation propagated through space at the speed of light (300,000 km/s), and depending on its power level, has the ability to be detected at great distances across interstellar space. It has been theorized that Extra Terrestrial Intelligence's may be using Lasers (Light Amplification by Simulated Emission of Radiation) as a means of communication.


A laser has the ability to send vast amounts of data in a very short time. For instance, imagine all the information contained in the Encyclopedia Britannica being transmitted in a half a second. This is a possibility today with current technology. Laser technology would be ideal for transmitting messages, over cosmic distances. If any alien civilization is using this type of technology within 100 light years distant from the Earth, it should be possible to build an instrument to detect the transmissions.

How could we detect these pulses? Well, first of all we must design some hardware that can count Photons in a given part of the sky very accurately. Any sudden burst in the photon count could be a Laser detection or evidence of some other high-energy event that is a naturally occurring event such as a meteorite or perhaps a super nova. As with our microwave receivers, the output signals need to be "down converted" so we can analyze the structure. Analysis techniques such as the Fast Fourier Transform could be used to scan the optical noise for statistical similarities. This is similar to what we do with microwave SETI. There is background noise generated by stars and highly exited atoms in space. The noise for Optical Seti is the light generated by stars and other energetic natural sources, both visible and invisible. This background noise needs to be calculated and accounted for in any software used to do the signal processing. Any signal received would be "brighter" compared to the calculated background and as such would be catalogued as a possible detection and set aside for follow-up observations.




Materials that are sensitive to high-energy photons that would be generated by a Laser need to be used in the detector. A short integration time is required due to the fact that the telescope will be mostly operated in drift scan mode and this will also reduce the number of erroneous detection's.

Methods of counting photons by using a "Photo Multiplier Tube" cooled with liquid helium were developed in the 1960's This system is expensive to operate and maintain and for this reason I decided to look for another way to design a detector. In about 1985 I read a paper on the materials being tested for use in solar cell