

The Extended Enviro-Guitar (XEG): A Mobile Acoustic Profiling Resonating Filter

Colin Black
Cydonian Sounds, Audio Lab
PO Box 92
Seaforth, NSW, Australia
+61 2 9400 544
colinblack@tpgi.com.au

ABSTRACT

In this paper, I explore the initial research and development regarding my mobile experimental "Extended Enviro-Guitar" (XEG) instrument/s as a type of resonating acoustic profiling device. It also explores the possibilities of using multiple XEGs within site specific physically spatialised multi-instrument installations and the deconstruction of this abstract sonic terrain via emerging mobile technologies.

1. INTRODUCTION

As part of my arts practice I utilize the XEG as a mobile resonating acoustic profiling filter within a creative context. This instrument, which is still in a research and development stage is essentially a specialized transducer and unlike conventional professional microphones which aim not to colour the sound recording, the interesting element about the XEG is how it does filter (or colour) its surroundings in sound recordings. Just like an infra-red filter or thermographic camera reveals a heat based topography of locations or objects, the XEG acoustic profiling filter (in its various configurations) reveals a sonic topography concealed by conventional transducers.

2. THE XEG

Because fluctuating waves of air pressure and flowing air can actuate the XEG's 2 -15 meter long strings, (which function in a similar way to a conventional microphone's diaphragm) and as the XEG is a device that changes this physical kinetic energy into electrical energy the XEG is clearly a type of transducer.

The XEG also resonates as a result of a phenomenon known as vortex shedding. During periods of flowing air a vortex is formed behind the string causing it to vibrate at a frequency which is the speed of the wind divided by the size of the string [1]. This resonating indicates the presence and to some degree the intensity, of a velocity vector to the propagating sound waves within the environment [2]. When the XEG is used in stereo multi-

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instrument installations this reveals a kind of sonic goniometrical recording of this physical medium.

To date I have only utilized strings with various lengths and diameters made from various mediums but I am aiming to experiment with various light weight sheets of metal and other materials suspended and attached to the conventional strings of the XEG (and/or other mounting techniques) across the spaces of selected location to actuate the XEG.

Combining synchronous conventional X-Y configured stereo recordings (using a Rodes NT4 mounted inside a Rycote windshield) and the XEG stereo multi-instrument installation in alignment with each other results in a binaural sonic interplay between the two sources.

To date I have used this interplay as a source of inspiration for the creation of a major sound art / radio art work entitled "Alien In The Landscape", which was commissioned by Deutschlandradio. This sonic art work reaches into remote locations that the enigmatic Australian explorer Ludwig Leichhardt passed through, "spiritually tracking the residue left by this alien" in the Australian landscape with the XEG, an adaptation of the traditional guitar that is actuated by the various specific out back environments.

Data collected during the field trip (which resulted in the creation of "Alien In The Landscape") demonstrates the spectral differences between the XEG and conventional transducers. Both Figure 2 and Figure 3 were recorded at East Alligator River (approximately 3 meters from the river bank) located within Kakadu National Park (Australia) synchronously at around 6 am. The Sennheiser MKH 416 - P48 3U Condenser Microphone was chosen as a sonic control due its flat frequency response between 40 - 20,000 Hz (see Figure 1).

No audio effects were added to these recordings in Figure 2 and Figure 3 other than gain to achieve a balanced level between the two sources. Assuming that Figure 2 is a close approximation of an uncoloured sound recording then the difference between Figure 2 and Figure 3 illustrates the spectral characteristics of the XEG for this sonic instance. It must be noted that the XEG's signal to noise ratio is less than that of the Sennheiser MKH 416 and benefits from noise reduction plug-ins which typically reduces the XEG higher frequency response pattern from around 2kHz and upwards, but for the purity of data I have not included these results in this paper.

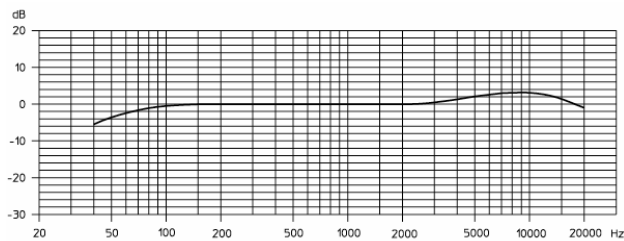


Figure 1. Frequency response of the Sennheiser MKH 416 – P48 3U Condenser Microphone.

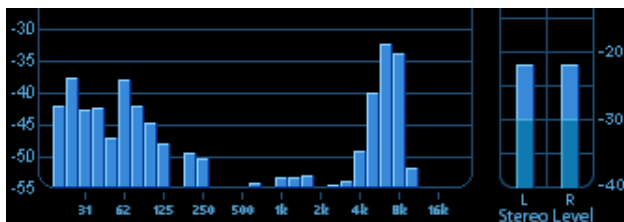


Figure 2. Sennheiser MKH 416 – P48 3U Condenser Microphone spectral analyzer snapshot.

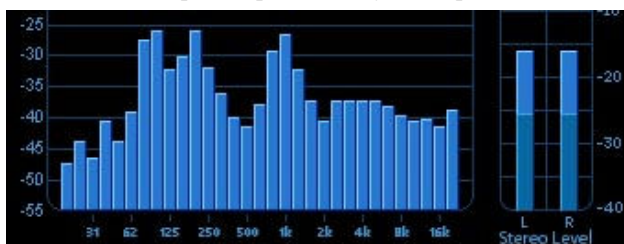


Figure 3. XEG spectral analyzer snapshot.

Figure 3 reveals the XEG's selective enhanced response to frequencies around 1 kHz and 200kHz and lack of response at around 6 - 8kHz resulting in a significantly different frequency response compared to the Sennheiser MKH 416 in Figure 3.

As the XEG displays noticeably different characteristics (spectrally and resonantly) in the act of transduction regarding kinetic energy, specifically the physical medium air into audio, I think of my XEG practice as a kind of audio filtering producing "sonic resonating spectroscopy". The review of this data to date has revealed a wide range of sonorities that have various artistic applications when collated and enhanced or examined through various processors.

Acoustic ecology has shown how time based factors have impacted on soundscapes from highly defined acoustic profiles of the rural environments to media rich and mechanical modern day cities [3]. As the XEG, when used in stereo and/or multi-instrument installations reveals a kind of sonic goniometer, I see my XEG practice as an ongoing investigation into the acoustic profiling of specific sites through a type of "sonic resonating spectroscopy" resulting so far in a chiefly artistic interpretation of the collected data. Simply put the XEG is a kind of mobile acoustic profiling resonating filter that documents selected sites and have been used to create artistic sound art works.

Mobility of the XEG acoustic profiling resonating filter and associated equipment is a necessity for the XEG to carry out its site specific function as demonstrated with recent recordings made in the Australian desert and remote locations.

While types of Aeolian Harps and/or transducers are not new the application of the XEG as a mobile acoustic profiling resonating filter and the development of spatialised multi-instrument XEGs may be? To date I have not been able to find other similar practitioners but that not to say conclusively that there are none.

3. FUTURE XEG RESEARCH AND DEVELOPMENT

The possibilities of using multiple XEGs within site specific physically spatialised multi-instrument installations and creating complex surround sound resonating filtered acoustic profiles offers potential for extended artistic expression. The deconstruction of these abstract sonic terrains via emerging mobile technologies, including positioning mapping and dynamic virtual interactive surround sound panning and proximity of multiple XEG streams delivered via headphones to the interactive audience/performance space, offers exciting new immersive sonic territory.

With the aid of emerging mobile technologies, artistically the interesting factor for the development of XEG is how it could reveal a dynamic spatialised sonic topography concealed by conventional transducers. Sites like Stonehenge's circumference could be profiled using multiple XEG's at midnight during the winter solstice to evoke an abstract spatialised interactive sense of place.

This type of development of the XEG could of course explore the interface between two classes of physical kinetic energy being acoustical energy and human movement. This new interactive immersive sonic territory could possibly be "performed" by a dancer trans-navigating and interacting with the dynamic spatialised sonic topography.

4. ACKNOWLEDGMENTS

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5. REFERENCES

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