Infra Sound

I have performed research on this in the past, as part of a geological survey project on earthquakes, but only in the last five years have I given infrasound a renewed interest as a possible path to explore with paranormal research. First, a little background; Infrasound is sound that is subsonic, or essentially frequencies too low to be detected by the human ear. The study of these waves is sometimes referred to as infrasonics, covering sounds from the lower limit of human hearing (about 16 or 17 hertz) down to 0.001 hertz. This band of frequencies is also as mentioned above the same ones used by seismographs to monitor earthquakes. A rather unique aspect of Infrasound is its ability to cover long distances and get around obstacles with little dissipation.

It is generally held that the first observation of naturally-occurring infrasound was in the aftermath of the Krakatoa eruption in 1883, when concussive acoustic waves circled the globe seven times or more and were recorded on barometers worldwide.

Infrasound has a military history as well. It was used by Allied forces in World War I to locate artillery; the frequency of the muzzle blast from firing was noticeably different than that produced by the shell's impact explosion, allowing the two sources to be discriminated and located geographically.

One of the pioneers in modern infrasonic research was French scientist Vladimir Gavreau, born in Russia as Vladimir Gavronsky. He became interested in infrasonic waves during an experience in his lab during the 1960s when he and his lab assistants experienced pain in the ear drums and shaking lab equipment, while no audible sound was detected by his microphones. He postulated that it was infrasound and began a series of experiments to map out the phenomena. One of his experiments was an infrasonic whistle.

Scientists accidentally discovered that the spinning core or vortex of a tornado creates infrasonic waves. When the vortices are large, the frequencies are lower; smaller vortices have higher frequencies. These infrasonic sound waves can be detected up to 100 miles away, and are used to provide early warning of tornadoes.

A number of American universities have active research programs in infrasound, including the University of Mississippi, Southern Methodist University, the University of California at San Diego, the University of Alaska Fairbanks, and the University of Hawaii at Manoa.

Concerning behavioral patterns of animals and the infrasonic effects of natural disasters, it is to be noted that animals can also recognize the infrasonic waves emitted from such natural disasters and can use these as an early warning. A recent example of this is the 2004 Indian Ocean earthquake. Animals were reported to flee the area long before the actual tsunami hit the shores of Asia. It

is not known for sure if this is the exact reason, as some have suggested that it was the influence of electromagnetic waves, and not of infrasonic waves, that prompted these animals to flee. Elephants have been known to hear infrasound from two and a half miles away.

It has long been realized that infrasound may cause feelings of awe or fear. My own research in the seventies and eighties with sonic weaponry revealed much in the way low frequencies affect the behavior patterns of humans. Since it is not consciously perceived, it can be used to make people feel that supernatural events are taking place. In a controlled experiment published in September, 2003, people at a concert were asked to rate their responses to a variety of pieces of music, some of which were accompanied by infrasonic elements. The participants were not aware of which pieces included the infrasound. Many participants (22%) reported feelings of anxiety, uneasiness, extreme sorrow, nervous feelings of revulsion or fear and chills down the spine which correlated with the infrasonic events. In presenting the evidence, the scientist responsible theorized that the results witnessed suggested that low frequency sound can cause people to have unusual experiences even though they cannot consciously hear it. Some scientists have suggested that this level of sound may be present at some allegedly haunted sites and so cause people to have odd sensations that they attribute to a ghost.

My own findings support these ideas. I also plan to perform a series of experiments to detect these frequencies at a “haunted” site, and see if they are a contributing factor. I will also try to determine the source of these frequencies. Maybe they are coming from a source that also produces paranormal phenomena.

Horror movie makers have used this for years. Alfred Hitchcock used infrasound to produce unease or disorientation in the audience in some of his film soundtracks. Others have used this technique as well.

The late Vic Tandy, a lecturer at Coventry University, suggested that the frequency 19 hertz was responsible for many ghost sightings. He was working late one night alone in a supposedly haunted laboratory at Warwick, when he felt very anxious, and saw a grey blob out of the corner of his eye. When he turned to face it, there was nothing there. The following day, he was working on his fencing foil, with the handle held in a vice. Although there was nothing touching it, it started to vibrate wildly. Further investigation led him to discover that the fume hood fan was emitting a frequency of 18.98 Hz, very close to the resonant frequency of the eye also given as 18 Hz in NASA Technical Report 19770013810 by the way. This was why he believed he saw a ghostly figure, believing it was an optical illusion caused by his eyeballs resonating. In addition, the room was exactly half a wavelength in length, and the desk was in the center, thus causing a standing wave which was detected by the foil.

Vic investigated this phenomenon further, and wrote a paper entitled The Ghost in the Machine. He carried out a number of investigations at various sites believed to be haunted, including the basement of the Tourist Information Bureau next to Coventry Cathedral and Edinburgh Castle.

There is just one problem with Vic's consensus. If his eyes were at resonant frequency, he would have still seen the ghost when he looked at it straight on.

So the question remains, how do we measure infrasound?
As an audio engineer it is easy. We just need a lot of special equipment, such as a RION NA-18 Infrasonic meter & 1/3 Octave Band Real Time Analyzer (with G-weighting, freq 1-1k Hz) $7,150.00 and $5,500.00 respectively.

Ok, that is a bit steep for the average researcher. Let's move down a notch.

We could use an NTI Acoustilizer AL-1 compact acoustic analyzer ($975.00) and a calibrated microphone capable of measuring 1 Hz, such as the Earthworks Audio M50 calibrated Microphone ($2500.00).

Still too much? Ok, how about the G.R.A.S. Sound and Vibration Type 40AN microphone (800.00 Euros) matching GRAS 26AG preamp (1082 Euros) And a Techtronics 100 MegHz oscilloscope ($4,000.00).

I think you get the picture. The precision measurement of Infrasound is an expensive proposition. The trick here is it requires a special microphone and a special preamp. Most consumer electronics and even pro application electronics in the audio field have a frequency response falling somewhere between 20 Hz and 20 KHz, well beyond the realm of infrasound. So what does a researcher on a limited budget do? Save your money!

There seems to be a few groups out there claiming to be doing Infrasound research, but from what I have read on their sites they apparently have little understanding of Infrasound, and for that matter, sound in general. Let me demonstrate why I think this. One site I visited talks about Vic Tandy's infamous discovery concerning Infrasound and "haunts" then casually explains how a seven hertz signal generated by ocean waves was the cause of the Flying Dutchman/Mary Celeste type of crew disappearances. Sounds believable until you realize that 7 Hz is the pivot frequency of our own brainwaves, and also very close to the Schuman resonance, the most prolific frequency on the planet. **Alpha waves** range between 7-12 HZ. This is a place of deep relaxation, but-not quite meditation. In Alpha, we begin to access the wealth of creativity-that lies just below our conscious awareness - it is the gateway, the entry-point that leads into deeper states of consciousness. Alpha is also the home-of the window frequency known as the Schuman Resonance, which is the-resonant frequency of the earth's electromagnetic field. (The Schuman resonances are standing extremely low frequency (ELF) electromagnetic waves. There frequencies are in

the same range as brain waves. They vary in intensity locally and temporally, depending on the distance between the surface or the earth and the ionosphere, which form two conducting layers separated by an insulating layer. These ELF waves seem to amplify brain waves, and through the quantum Zeeman-Stark Effect cause other changes. They also drive brain waves of the same frequency and of harmonic frequencies. Shuman resonances are best measured by the horizontal component of the atmospheric magnetic field. They have been measured all over the earth. Frequency peaks in cycles per second are reported at 8, 14, 22, 26, 32, and 38. Lightning is believed to also operate in the 8 Cycle Schuman resonance. While there are some “doom and gloom” folks out there claiming that the Schuman Resonance has shifted upward, it is complete and total hogwash. The background base resonance is measured daily by the Navel Research Labs and is posted somewhere on the web. I have looked it up in the past. It has not changed at any time since it has been measured and is not changing now. The laws of physics still work the same way today as they have always worked. What is a Schumann Resonance? Believe it or not, the Earth behaves like an enormous electric circuit. The atmosphere is actually a weak conductor and if there were no sources of charge, its existing electric charge would diffuse away over a long period of time (due to the atmoshere’s insulative nature). There is a 'cavity' defined by the surface of the Earth and the inner edge of the ionosphere 55 kilometers up. At any moment, the total charge residing in this cavity is roughly 500,000 Coulombs. There is a vertical current flow between the ground and the ionosphere of 1 - 3 x 10^-12 Amperes per square meter. The resistance of the atmosphere is approximately 200 Ohms, so the voltage potential is at around 200,000 Volts.

The electrons that are sent by the sun meet up with the negatively charged ionosphere and are repelled or slowed down and accumulated. The Earth's atmosphere is an insulator to electrons and they do not have enough inertial energy to penetrate it. The ionosphere is highly negatively charged (electrons) and conductive. The charge keeps increasing until the atmosphere beaks down and the electrons find their way to the Earth in the form of lightning.

This ionospheric (sphere of ions) charge creates an electrical shield around the Earth. This shield then becomes the outer conductor of an electrical sphere (the Earth) within a sphere (the ionosphere). The atmosphere is a dielectric insulator, which separates the two. Thus a spherical capacitor as well as a spherical resonator is created and maintained. Electrical signals of sufficient wavelength (low frequency) are wave-guided around and around between this "sphere within a sphere" and is known as the base Schumann Resonance of 7.8Hz mainly traveling from West to East.

During a solar flare, the aurora borealis is seen as the electrical current through the upper atmosphere increases enough at that altitude to cause secondary emission in the form of light.

So, by their line of thought we should all be mad. The key here is amplitude. ANY frequency that is propagated at sufficient level will have some effect on the body. But that level is far above what exists in nature. So we don't go crazy, and leap off a ship in the middle of the ocean.

Sorry for the tangent. To continue….

Another website professing to be doing Infrasound Research shows a tripod mount device with a parabolic reflector and an extremely large tube on the back side of it. From the photos it is hard to tell what sort of element is being used inside the tube, but I will guess it is some model of a standard microphone enclosed in the tube. I am sure they are measuring sound, but they are certainly missing the boat on Infrasound. Consumer available Microphones go down to 15 Hz at best. Some people are capable of hearing 15 Hz, so it is not considered infrasound at all, but the low end of audio. Many subwoofers mounted in automobiles go down to 15 Hz as evident when one drive's by your house operating at near full volume and your dishes react by vibrating on the shelves. Impressive, but not Infrasound. Parabolic reflectors are used in many cases to provide directivity and gain to audio in the voice spectrum. They are specially designed reflectors for the audio frequency spectrum. The parabolic dish they are using looks a lot like a satellite TV dish. While it will provide some degree of directivity, the gain is not going to be much. In the photos on the site they show a photo of their equipment set up, and there is a rack of equipment with headphones attached. Just exactly what are they listening to? Infrasound can't be heard. Also, the headphones only respond down to about 50 Hz on most models, but there are some models capable of going down to 20 Hz, by using electronic enhancement.

So here is the deal; there is NO WAY to take a standard microphone diaphragm and "soup it up" to detect Infrasound. The nature of the coil and diaphragm make it impossible. A specially designed coil and diaphragm are required, and better still, a laboratory standard Condenser Microphone, and then the device MUST be calibrated to insure its accuracy at such low frequency use. Some people apparently have read a little and applied their little reading to a project. An example of this would be to build a resonant frequency enclosure for the microphone diaphragm to dwell in that would allow it to enhance low frequency response. This line of thinking is incorrect. Frequency response in a microphone is determined by the diaphragm, voice coil, and to a degree, sensitivity and proximity. Most consumer grade microphones only go down to around 50 Hz. Studio grade microphones will go down to 20 Hz. However, some of these microphones can produce down to around 15 Hz at a much lower level than normal operation, requiring additional amplification.

Only Laboratory grade microphones can go below 15 Hz.

An example of this type of microphone would be the G.R.A.S. Type 40AN, capable of measuring from 1Hz to 20KHz. Then there is the Earthworks Omni M50, capable of going down to 3Hz but effective to 1Hz ($2500.00). Then there is the issue of amplifying the signal for measurement use. All consumer brand of pre-amplifiers are incapable of reproducing these signals, primarily because they use filters to eliminate them. There for, a laboratory grade preamp is required such as the Earthworks 1021 Zero Distortion Technology Preamp($1275.00), or the FEMTO DLPVA-100-F Variable gain Low Frequency Voltage Amplifier (Still waiting on a quote but expensive). These devices are very expensive. Then there is the supporting equipment, like an audio Analyzer and software. I use SmartLive Analysis Software ($703.00) and Acoustic Tools Analysis Software ($608.00), plus an NTI Acoustilyzer (expensive), and on and on.

Then there is the “What exactly are they measuring” Question. Measuring level is helpful, but we really need to identify the frequencies at work. Pretty much all of these sites are measuring, or trying to measure the presence of Infrasound, and nothing else. Well guess what? You are always going to find Infrasound. This in and of itself tells you nothing, as infrasound is everywhere. What we need to know as researchers, is level and frequency. With that information we can trace the source and eliminate it as a factor in paranormal activity. NO one is doing that. If they were, they would discover that Infrasound is not a simple, single frequency, but instead is a composite of MANY signals meshed together, including audible sound.

In fact, the only people who are SERIOUS about infrasound research are a small handful of psychologists, and an army of volcanologists. It is the later group that has peaked my interest. They have discovered a very cheap source for a low frequency microphone, the Panasonic WM-034 series and WM-52B/54B series. Only the microphones are no longer available and have been discontinued. HOWEVER, there is good news. They have been replaced by the WM-61B, WM-64PN and WM-64PC. I found the WM-60PC at Jameco Electronics for 99 cents each.

http://www.jameco.com/webapp/wcs/stores/servlet/ProductDisplay?langId=-1&storeId=10001&catalogId=10001&productId=1585944

I am interested in the WM-64PKT and have ordered a few

http://www.jameco.com/webapp/wcs/stores/servlet/ProductDisplay?langId=-1&storeId=10001&catalogId=10001&productId=160979

At any rate, this leaves us with a problem of finding a preamplifier capable of boosting the level of these microphones. I am planning on using the MM-Stereo Preamp high Gain/Low Noise portable unit from microphonemadness.com for around $150.00 with shipping. I am currently using the mono version of this amplifier to amplify sub audio frequencies detected by the background noise

detection device, which diagram is above, along with photos of waveforms captured at our last investigation.

So, once they get equipment that can detect Infrasound, they will need to measure the frequency of Infrasound. The easiest way to do this is with a spectrum analyzer. However, these are expensive devices. One can also measure amplitude, frequency and look at the composite waveform with an oscilloscope. EVERY serious researcher in the field should have at least 1 hand held oscilloscope, and Velleman has one for under 150 bucks. Check at

http://www.tequipment.net/Velleman_HPS10SE.html

Check the site for other deals in test equipment as well.

If our work is going to be accepted by mainstream science, then we MUST adopt the techniques and methodology of mainstream science. The sooner we all do that, the more advanced our strides will become, and the more we will be able to discover. In the case of Infrasound, we need to know what frequencies are present during a paranormal event, and if they are unique to the event. THAT is what we need to be looking for.