

HERTZ Experiencing the Earth's Inaudible symphony

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Introduction

Imagine the inaudible symphony that our planet creates resonating through your body. HERTZ is a project that makes this a reality. HERTZ is a project that aims to allow the inaudible sounds of our planet and beyond be experienced through touch and sight.

What is infrasound?

Infrasound are low frequency sound waves that are below the level of human hearing <20 Hz. They are produced by man made activities such as mining, explosions and supersonic aircraft. Infrasound is also produced by natural phenomena such as volcanos, earthquakes, glaciers, ocean swells and even the aurora borealis. Infrasound propagates through the atmosphere meaning it can be observed many 100s km away from the source.

Observing infrasound waves

Sound waves are simply minute pressure perturbations that pass through the Earth's atmosphere. Thus infrasound can be detected using precision microbarometers. A microbarometer consists of a aneroid pressure capsule that is connected to a network of porous hoses which ensures noise from the wind is removed from the measurement. Figure 1 shows a low-cost microbarometer which will be used in this project, Figure 2 shows a more elaborate setup where a large network of porous hoses spanning 4-5m are connected to the microbarometer which is then stored just under the surface.



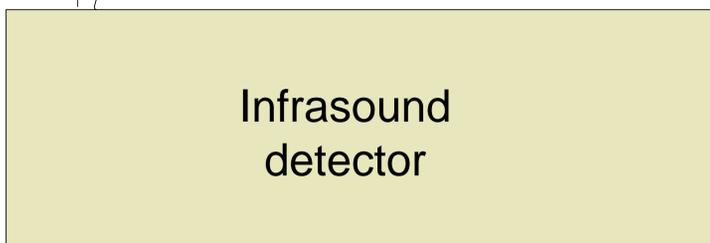
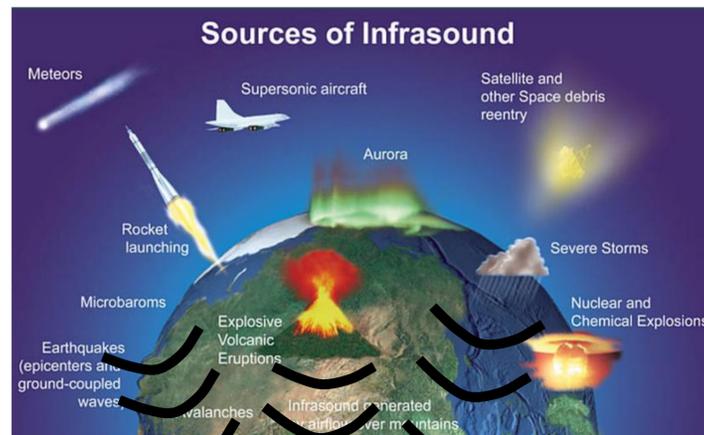
Figure 1: The INFILTEX INFRA 20 amateur infrasound detector



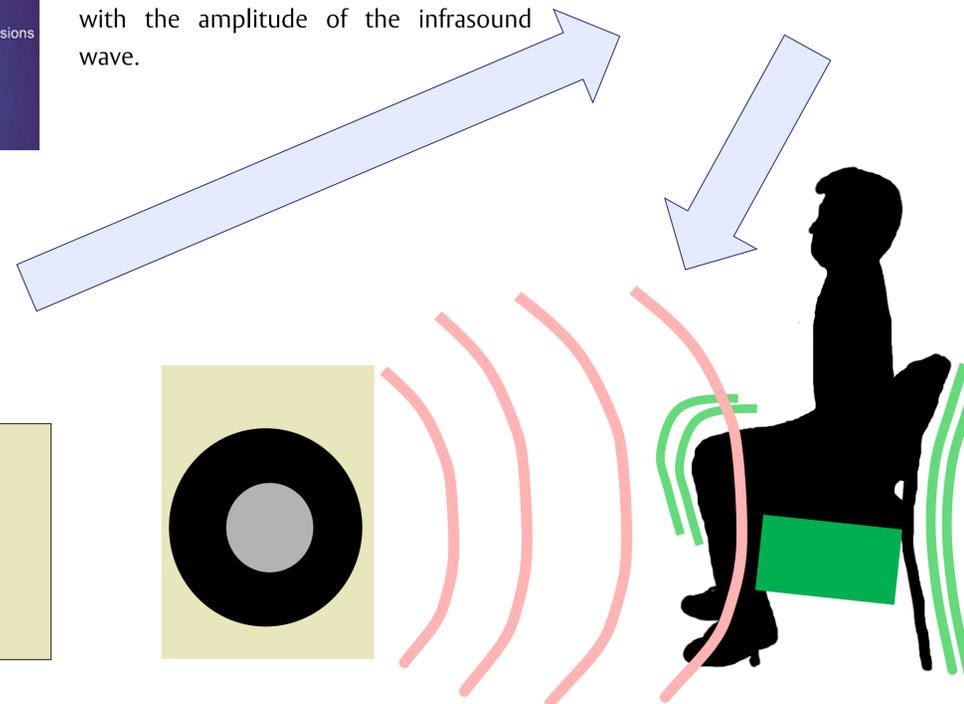
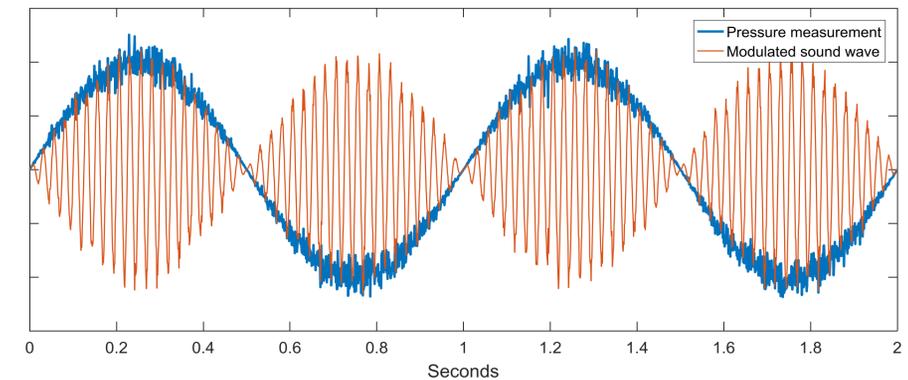
Figure 2: One node of an international monitoring system infrasound detector. The microbarometer is housed in the semi submerged box, which is connected to a large network of porous hoses

Method

1. Atmospheric infrasound is detected by the infrasound detector and logged on to a PC data logger



2. A Data Processing program takes the pressure measurement and uses it to amplitude modulate a 30-50Hz sound wave. This approach was used so the pulsing of the infrasound wave from can be played through both a silent sub woofer and a standard sub woofer. Alternatively the pressure amplitude can be used to modulate the frequency of the sound wave meaning the tone can vary with the amplitude of the infrasound wave.



3. The modulated sound waves are then played through **A** the sub woofer positioned near the participant and **B** through a silent sub woofer attached to the chair the participant is sitting in. The sub woofer plays very low frequency soundwaves allowing the modulated infrasound waves to be felt in the air. The silent sub woofer is a transducer which causes an object it is attached to vibrate. Thus the participant can then feel the infrasound waves produced by the Earth's inaudible symphony.

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- Graeme Marlton is an Atmospheric dynamics Research Infrastructure In Europe (ARISE) partner. ARISE is a European Commission project aiming to bring together different measurement technologies to build a 3D dynamical picture of the whole atmosphere. <http://arise-project.eu/>

Scan the QR code to listen to Infrasound and also find more about HERTZ!

