

"HEX" — "Holosound"

Logos-Duo

Godfried-Willem Raes, Moniek Darge

"HEX"

1 Concertversion

— a concerto for violin and computer-controlled orchestra composed of electro-acoustical self-built instruments.

Soloist: Moniek Darge.

2. Audio-Art Installation Project

— for laptop computer and eight caged electro-acoustical instruments.

Technical Description

One of the most striking characteristics of Godfried-Willem Raes' oeuvre since 1968 might very well be that most of his works in one way or another make extensive use of new and original instruments and sound sources. Here, most of the time these are fundamentally acoustical instruments and sound sources, this despite the fact that the sounds often reach the audience through loudspeakers. This certainly also applies to his "HEX": although in both versions of the piece a central computer, controlling the global evolution of the music through time, is being used, all sounds that can be heard originate from physically vibrating objects such as strings, metal blades, springs, etc No electronic sound oscillators of any kind are used in the piece. This counts for the very fact that the sound material used in the piece never sounds as if it were a caricature of real-world sound, such as it happens to be all too often the case in electronic music. Electronic circuitry nevertheless is both visually and functionally highly present and dominates the whole piece. On the level of the generation of the sounds themselves, small but fast dedicated computer systems are used to strictly control the vibrational modes of the physical objects incorporated on the printed circuit boards that make up the individual instruments. They are programmed in such a way that no periodic oscillations in the objects will ever occur. The circuit first strikes the object, then reads in any occurring resonances. A numeric calculation follows resulting in the outputting of a sequence of pulses slightly different than the number read in first. From here on the process — in fact some kind of calculated feedback loop is repeated until a stop instruction follows. These circuits — developed and built to this purpose by the author (in "HEX" they are eight) — on their turn are individually controlled by a small laptop computer serving as a central macro-controller. It is connected to the individual cards with an 8-bit wide parallel bidirectional link. This computer, a modified Epson HX-20, runs the programs for either the concert-version, or the installation version of the piece. As the vast majority of real-time algorithmic tasks in this setup have been delegated to the individual instruments-on-a-card, the use of a small central computer became possible as its task is limited to the execution and control of the macrostructure of the musical composition. In the concert version, this program is made to be interactive such that the central computer has to be operated by the author, who can determine the expressive course of the piece in real-time depending on the performance circumstances. The computer together with the operator get the role of the orchestra and are used in much the same way as the violin-solo would be in a classical concerto. But, the violin does not get a completely individual musical line, since its sounds are made accessible to the computer and can be modulated and integrated in the palette of the orchestra. In this respect the piece becomes really interactive.

In the version of "HEX" as an automated audio installation project, the central computer runs a very different program, whilst also the visual presentation of the piece is very distinct. Here all the instruments-on-a-printed-circuit-card are mounted in cages, a bit like musicians in an orchestra. They are all connected with the central computer via long flat cables and perform skillfully its commands and programmed wishes. Nevertheless they all have a character of their own, a character on which the central brain has absolutely no control.

A visual feature of both versions of "HEX" consists of the fact that all the circuits, instruments and boards are left open and bare. Thus all the functioning of the attached physical objects can be perceived by those who watch them closely enough. Thus the setup has on the one hand something quite magic in its general appearance, but on the other hand demystifying for whoever pays attention and comes close.

Creation and origin

"HEX" was premiered in the capital of Rwanda, Kigali, during March 1988. The piece was on the Logos-Duo's repertoire on their world tour in that month and was further performed in Nairobi, Bangkok, Wellington (in the computer music festival), Auckland and Hongkong. The first European performance took place in The Hague in June 1988 at the occasion of the Audio Arts Festival. Moniek Darge played the role of the soloist in all of these performances.

The installation version will be premiered at the Linz festival in Austria, together with the older "Holosound" installation. After that it is scheduled to travel to Köln and different places in the USA.

S.L.

"Holosound"

"Holosound" is an intermedia project by Moniek Darge and Godfried-Willem Raes:

holosound bewitches space, space vibrates by slightest movement
one finger / one toe / causes waves, waves
hit the eardrum and become sounds
hearing movements
a spell of witchcraft / sorcery
red circles as demarcation lines
boundaries of magical spheres
keys of metal sounds
fascinating centre of nothingness
firephoenix and smoke
wordless disappearing in emptiness

The Ultrasonic Motion-Holograms Holosound creates, translate every single movement into sound.

Holosound also attempts to be a possible realization of a dynamic multi-dimensional oscillating system, real-time controllable by means of direct and aesthetically relevant body movement of a performer.

Movement isn't only visible, but audible as well.

A frequency modulated ultrasound-emitter is placed in a space and directed towards three ultrasound-receivers, placed on the four corners of a imaginary tetrahedron (all angles 60 degrees).

The space becomes bewitched and is delimited by two red magic circles.

As soon as the performer moves in the space circumscribed by the outer sphere around the tetradron, each of the three receivers will detect a different differential signal within the audible range: the movement causes a Doppler-shift of the original ultrasound wave, and due to relatively slow body-movement, a slight pitch-shift is produced. This differential shift is within audible range.

All of the sounds are generated exclusively by the movement of the performer inside the magic circles. She plays a mysterious invisible instrument, she plays the space itself.

The second performer is sitting motionless, outside the magic spheres, operating electronics that mix and control the three signals. The resulting sum is then used as a frequency modulation source for the ultrasound-emitter. This part of the equipment constitutes a first multi-dimensional oscillating system entirely controlled in a relevant way by movement. A sound-hologram is created, and using exclusively musically relevant parameters, as opposed to systems that are basically proximity devices, mostly controlled by light.

A second three-dimensional and quadrophonic oscillating system is used in the second part of the Holosound piece. The three signals from the ultrasound-receivers are used as inputs to special magnetic transducers that force a given set of changeable objects (e.g. springs, razor blades, steeltape, plastics ... at the end, even a sandwich would do the job ...) to vibrate. At another spot on these objects, a pressure-transducer (we use piezoelectric discs) is attached, and the signal generated here is amplified and converted to a digital format where it can be treated in a computer-controlled modulo-N divider/ multiplier. After this programmed process the signal is fed back into the vibration-transducer together with the original signal derived from the ultrasound-receivers. Thus four three-dimensional and controllable oscillating systems are created that are only triggered by the original movement.

Sinisterly the centre of the inner circle attracts the performer and irrevocably the inner witch-circle is penetrated. The audience gets to hear a scored and ever changing mix of sounds originating from the complex modes of vibration in the whole system.

Diabolic metallic sounds resonate fiercely and punish the intruder. The performer is captured by the tremendous sounds provoked by her own moves and is born again as Phoenix-bird.