





Daniele Pozzi

danepozzi@gmail.com Gustav Mahler Private University for Music (GMPU) Klagenfurt, Austria University of Music and Performing Arts Graz (KUG), Austria

DOI 10.34626/xcoax.2023.11th.378

Trópos is a multichannel sound installation for public spaces, based on several mobile sound units — small photovoltaic computers, equipped with microphones and loudspeakers — that sonically adapt to the soundscape around them. Each element independently interacts with the sounds picked up by the microphone, generating emergent sound developments which are strongly dependent on the acoustic environment in which the piece is installed. The way the sound units act on, and react to, their environment, embedding themselves ecologically within it, is a central compositional question in *Trópos*. The ambience's specific architectural, spatial and acoustic characteristics inscribe themselves in *Trópos*, creating a form of sonic interdependence and generative co-existence of site and work.

Keywords: Sound Art, Generative Art, Public Space, Soundscape, Acoustic Ecology, Embedded Systems, Solar Power.

Background

Trópos was commissioned by Klangnetze, a collaborative sound art project that took place in Summer 2022 in Styria, southern Austria. The project might be more precisely framed in the context of environmental sound art, a term used to denote works that utilize the (acoustic) environment as site or material (Bianchi and Manzo 2016; Gilmurray 2016). The aim of Klangnetze was to bring sound art to public spaces where it is not commonly found: city streets, yards, squares, as well as rural areas surrounded by nature. A custom electroacoustic setup was developed to populate such places with portable sound units: solar-powered embedded systems for real-time sound processing, each equipped with one microphone and one loudspeaker. A total of twenty-five sound units was distributed among five selected locations in Styria.¹ For two months, between July and August 2022, they hung on light poles, trees, rooftops, gratings, gutters, balconies and windows, and they established a sonic dialogue with the urban and rural soundscapes of the Austrian region that borders Slovenia.

Figure 1: Sketch representing the positions of five sound units on the South facade of St. Laurentius Church in Gleisdorf main square, Austria.



The project presented several technical challenges, but it faced also some very concrete compositional questions: how to compose for these unusual exhibition sites? Many aspects need to be considered when bringing sound art to the public space. First and foremost, aural awareness is inclusive, rather than selective. One cannot choose not to hear a sound that is present in a certain environment. Therefore, those sounds which are deliberately inserted in the public space must be carefully considered, and it is crucial to think about how the sound work affects its acoustic context. A second important auditory aspect of a public place is that there is no such thing as "silence". There is no acoustic framing, like in a gallery or concert hall. Public spaces come together with their own *soundscapes*

The selected locations were: Leibnitz main square, Gleisdorf main square, Eisenerz main square, Ligist Schillcherhof, Spielberg Marktpassage. These are pictured in Fig. 2. In each site, five sound units were installed at a distance of 5~15 meters between each other. As an example, Fig. 1 and Fig.
 illustrate a five units setup in Gleisdorf main square.

(Schafer 1977), which are in themselves dynamic and specific to that exact place. A sound work that aims for a sonic dialogue with the site it is installed in must consider this pre-existing soundscape. One must carefully reflect on how the acoustic context affects the sound work. The balance between these forms of mutual affection, between sound work and soundscape, posits a form of ecological speculation that is central to the Klangnetze project: can such forms of affection be *composed*, so that an aesthetic interdependency between site and work emerges? Can the soundscape itself become both site and material, and is it possible to establish a form of generative co-existence with the *sounding environment* (Tzedaki 2012)? *Trópos* is my sound answer to these questions.



Figure 2: Klangnetze sound units installed in Leibnitz, Spielberg, Gleisdorf, Eisenerz, Ligist.

Figure 3: Five sound units installed on the South facade of St. Laurentius Church.

Affect

Trópos is based on a self-developed frequency modulation (FM) synthesizer written in the SuperCollider language, in which two sine oscillators recursively cross-modulate each other. A central idea in *Trópos* is to work with sounds that might be confused with those already present in the public space, and this FM synthesizer, despite its structural simplicity, can produce rich organic textures that might match the acoustic situation of a urban soundscape. A process of mimesis is synthesized in real-time, which plays with the boundary between plausible (Neuhaus 1992) and implausible sounds. This process is executed in parallel and distributed among the five sound units, which however never operate simultaneously: they rather play scattered in time, appearing, and disappearing with long fade ins and outs. This enhances the camouflaging effect by delaying the moment at which a sound unit is perceived as present within the acoustic environment. Both the temporal and timbral characteristics

of *Trópos* were composed to establish a gentle and organic acoustic co-existence of sound processes and soundscape.

Being Affected

Each Klangnetze sound unit is equipped with a small microphone, similar to those commonly found in everyday smartphones. This provides an immediate opening to the surrounding acoustic environment, so that every unit can "listen", from its unique perspective, to the urban soundscape around it. In *Trópos* the soundscape itself becomes a generative element that directly modulates the synthesis process in real-time (Fig. 4). Every sound reaching the microphone is embedded in the synthesis program, creating a form of ecological FM synthesis that relies on the external environment to let timbrical and temporal qualities emerge, specific to the site — and moment — in which the synthesis takes place. In doing this, a continuous process of sonic inscription is established between the environment and *Trópos*, through which the ambience's specific architectural, spatial and acoustic characteristics engrave themselves in the sound work.



Figure 4: Any sound in the acoustic environment, including footsteps of the passers-by, can affect the generative sound synthesis in *Trópos*.

Mutual Affection

The synergy between these composed modes of mutual affection is the concrete sound expression of an artistic attitude rooted in a form of inclusive ecological thinking. *Trópos* is in a constant acoustic exchange with its environment, and the feedback loop between work and its site generates a lively sound situation that aims a establishing a direct sonic interdependence with the place it is installed in. It is a sound proposition about the blurring of the border between piece and context, between artwork and exhibition space. It strives for a non-hierarchical, generative co-existence of site and work, drawing attention to what emerges when the distinction between the two becomes unclear. **Figure 5:** Solar-powered embedded system for ecological audio signal processing.



Acknowledgements. *Trópos* and *Klangnetze* were supported by Land Steiermark, Abteilung 9 Kultur, Europa, Sport and by Bundesministerium für Kunst und Kultur, öffentlichen Dienst und Sport. I am grateful to all the people who made this project possible, especially my colleagues who contributed to the collaborative exhibition: Luc Döbereiner, Margarethe Maierhofer-Lischka, Veronika Mayer, David Pirrò, Hanns Holger Rutz and Ina Thomann.

Documentation and Useful Links

Trópos audio and video recording (binaural, headphones suggested) are available at this page: <u>https://www.danielepozzi.com/tropos/</u>
The Klangnetze web catalogue (video, audio, pictures and text) can be found here: <u>https://klangnetze.mur.at/en/</u>

• A detailed guide on how to build an embedded system for real-time sound processing (Fig. 5) is linked on my website (<u>https://www.dan-ielepozzi.com/knv2/</u>).

References

Bianchi, Frederick W., and V. J. Manzo. 2016. Environmental Sound Artists: In Their Own Words. Oxford: Oxford University Press. Gilmurray, Jono. 2016. "Sounding the Alarm: An Introduction to Ecological Sound Art." Musicological Annual 52 (2). Marking the 70th Anniversary of ICTM and 20th Anniversary of CES Folk Slovenia. Music, Sound and Ecology. Ljubljana: Department of Musicology, Ljubljana University.

Neuhaus, Max. 1992. "Notes on Place and Moment." In *Inscription: Max Neuhaus: Sound Works*. Vol. 1. Ostfildern: Cantz Verlag.

Schafer, R. Murray. 1977. *The Soundscape: Our Sonic Environment and The Tuning of the World.* Rochester: Destiny Books.

Tzedaki, Aikaterini. 2012. "Into the Sounding Environment: A Compositional Approach." PhD Thesis. Leicester, UK: De Montfort University.