

# UNRUHIGE RÄUME - SPATIAL ELECTROACOUSTIC COMPOSITION THROUGH A COLLABORATIVE ARTISTIC RESEARCH PROCESS

*Pascal Baltazar*

GMEA  
4, rue Sainte Claire  
81000 Albi, France  
pb@gmea.net

*Bjørnar Habbestad*

BEK  
C. Sundtsgt. 55  
5004 Bergen, Norway  
bjornar@bek.no

## ABSTRACT

This paper presents the creative process behind the collaborative work *Unruhige Räume* and the tools used to realize it. Set as a piece for three computer instrumentalists and a 12-channel speaker system, *Unruhige Räume* is an electroacoustic work employing synthesis, sampling, processing and spatial projection in live performance. The piece is developed continuously until its premiere in March 2011.

Connecting their process to ideas and concepts found in philosophy, soundscape studies and music theory, composers and performers Habbestad and Baltazar present key challenges and choices made during the first periods of development, as well as instrumental design and composition aspects. They also address their approach towards defining a shared language to describe materials and compositional methods in use before sketching future work directions, and perspectives on the collaborative nature of the process.

## 1. INTRODUCTION

### 1.1. Context of the work

The authors were commissioned in 2009 to collaboratively compose and develop a work, fusing live electroacoustic music with realtime spatialization in a creative process, drawing both on compositional and improvisational strategies. The work is conceived as a collaborative artistic research process with a series of 6 residencies over a period of two years. Public presentations are being made as milestones in the development process from the start of the project until the presentation of the completed work in 2011.

### 1.2. Musical background

Some shared points of interest mark the starting point for this collaboration. The authors have both worked extensively on fusing composition and improvisation in different ways, through solo and collective projects. Electroacoustic instrumental design is also an important part of their musical statement, along with the development of adapted composition techniques. These concerns, along with the specified

task in the commission to explore spatial perception, formed the basis of the project.

### 1.3. Early experiences

After the first meeting, a concert of improvised music in early 2009, it became clear that maintaining a high degree of performative action and live control of the sonic material was not compatible with the desired amount of spatial realization. This led to the inclusion of sound engineer B. Maumus who has since been a vital element in the project.

## 2. INSTRUMENT DEVELOPMENT

Both composers are developing live software and hardware systems to support their performance practice. Both also consider electroacoustic instrumental design as an important part of their compositional process.

### 2.1. Respirator

*Respirator*<sup>1</sup> is an electroacoustic performance environment combining custom made software and hardware to facilitate real time synthesis and processing interaction between SuperCollider and Bjørnar Habbestad's electroacoustic flute.

The aim of the *Respirator* environment is to fuse a microphonic approach to flute playing with digital sound processing and synthesis. More precisely, it is a multimodal performance environment for real time synthesis and processing interaction between SuperCollider[3] and microphonic flute playing, where the flute is used as an acoustic sound generator, a gesture controller and a mechano-acoustic controller of acoustic feedback. It has a dedicated routing and control system for multiple microphone sources, and a modally changeable set of controllers, pedals, knobs and switches.

<sup>1</sup><http://respira2or.wordpress.com/>

## 2.2. Z

$Z^2$  is a modular environment for realtime composition and interpretation of gestural electroacoustic music, based on the Jamoma[4] framework for MaxMSP. The main features are a sample library management system and a set of sound and parameter generators, along with mapping and cue-managing modules allowing precise authoring of sonic scenes over time, including dynamic interaction settings.

In the  $Z$  instance designed for this project, sound is primarily generated using granular synthesis modules based on the GMU toolkit [5] and materials from a pre-determined sample library in addition to live input from the performers (flute and voice). Instrumental access via gestural interfaces including a graphical tablet, faders, and a multitouch screen, provide performative interfaces to the software system for expressive and extensive access to all available parameters.

## 2.3. MSpace

*MSpace* is a multitouch live sound projection setup based on  $Z$  and the Max Multitouch Framework<sup>3</sup>. It allows the user to intuitively and expressively design and record spatial placements and generative trajectories of sounds. This task is facilitated by the possibility of grouping up to 16 sources into 10 independent ensembles with independent parameters. Interactive items for sources and groups have physical properties implemented with the *box2d*<sup>4</sup> library in order to convey richer behaviors and a more natural look-and-feel to the instrumentenlist. Speaker subset definitions can be independently set for each source/group, as allowed by the speakers weight parameter of the DBAP [2] technique, in order to actually create topologies as described in 3.3. Finally, continuous transitions and snapshots of the whole state can be easily created, updated and triggered as a set of cues in order to design varying spatial strategies throughout the whole piece.

At the very beginning of the work process, a speaker placement setting was designed. A series of different tests were carried out before a setup including 4 full range speakers, 4 mid size monitors, 3 small near field monitors and 1 sub was agreed upon, as shown in figure 1

## 3. ARTISTIC DEVELOPMENT

### 3.1. Material generation

Initial artistic development of compositional material began by using an empirical approach : it started by recording improvisations, followed by playback and evaluation of materials. This bottom-up approach can be said to follow the legacy of the Schaefferian “musique concrete”[6] ; Starting

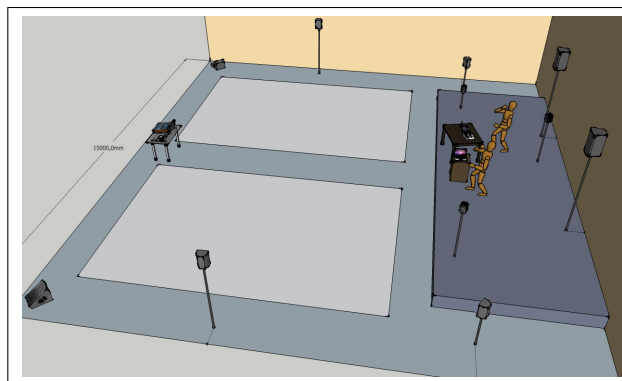


Figure 1. The speakers layout used for the work.

from the concrete attitude of listening and producing sound towards the progressive drawing of abstract structures and forms.

It consisted of a spiral of creation, evaluation, and re-creation aimed at identifying interesting material and diffusion types. If some elements showed potential interest, a new playback with multi-mono source material would happen in order to re-orchestrate and practice the spatial projection. Identifying material typologies as well as their relationship to spatial qualities and behaviors was integral to this work. Being able to evaluate with a double recording setup, enabling playback of both the diffused end result and its raw multi-mono source material proved to be a vital tool in this process.

### 3.2. Composition

In order to advance from a cyclic process of improvisations, discussions, and new improvisations, shared verbal concepts had to be developed to cover sonic character, material articulation, and finally spatial and physical concerns.

Temporal issues were discussed during the listening process. Listening in perceived time and listening following a precise timer gave a very different type of feedback to the evaluation process. Whereas listening with a clock provides a clear objective reference point for comments and is ideal for perceiving sonic materials as discrete events with certain sonic characters, listening without a clock proved to be vital to access a close relationship to the effect of the musical form and transitions. This distinction made us look towards the definition of *typologies* and *morphologies* as found in Murray Schafer :

“If typologies are systems for classifying sounds according to their various forms or functions, morphology allows us to gather together sounds with similar forms or functions in chronological or geographical sequence in order that variations or evolutionary changes might become clear”[7]

<sup>2</sup><http://github.com/bltzzr/Z>

<sup>3</sup><http://code.google.com/p/mmf/>

<sup>4</sup><http://charles.bascou.free.fr/box2d>

In order to obtain a shared point of temporal reference, we started using geographical concepts: *local*, *regional* and *global* to refer to the same kind of temporal scopes that Tenney defines in [9] but in a more continuous manner.

### 3.2.1. Local

Our first concern, as stated, was material development through improvisation. The first phase of classification focused on timed listening in order to keep a high level of precision when referring to sonic character, timbral qualities, etc.

Following this thinking we started classifying materials into two main typologies : figures and textures. Following Murray Schafer again, we could say that *figure* “is the name we can give to the unique event, the solo, the specific, the noticeable; *texture* is the generalized aggregate; the mottled effect, the imprecise anarchy of conflicting actions”[7]

Further typological classification under these two categories was done in regard to rhythmic, dynamic and timbral parameters such as density, grain, roughness, tonal / nodal / harmonic / noisy character, profile etc. Such a classification would then help on further analysis and combination of sonic elements in more dynamic compounds, coined here as *morphologies*

### 3.2.2. Regional

The natural extension of our classification activity was to move away from analyzing sections and stretches hunting for the right material, and onto trying to define specific sonic materials, shapes and behaviors into composed fragments or cells. Starting with a very basic notation we devised a series of phrases. Rehearsing these notated sections would lead into a reinterpretation or a refinement of the original cells. Further combining, interpolating and sequencing of cells led to a composed section. This marked the start of a different engagement in both the listening and the performance process.

Several regional composition methods have then been used throughout the composition process:

Composed fragments have been elaborated on a score basis and then rehearsed, refined and combined. Some improvised sections were developed based on composed parts or materials. Other sections were based on recorded improvisations, with again a substantial help from the double recording set-up, which allows for going back to decipher the exact sonic materials found in different sections, sometimes consisting in up to 10-12 parallel sound sources.

### 3.2.3. Global

While combining the typologies into higher morphological units, form was progressively developing from the material in an organic way : a matter is generated, then hybridized with others, and progressively consolidated until it creates a

strong enough identity to be conceived as a cohesive element in a “continuous development of the form and a continuous variation of the matter.”[1]

Then a formal structure was elaborated for all aforementioned parts and transitions designed between adjacent parts.

## 3.3. Topologies

Emerging from a discussion around the french term *Mise en espace* (roughly translated as sonic layout) some basic notions regarding the spatial projection were agreed upon. A general goal was to work towards creating the perception of multiple fragmentary sonic spaces in the room.

This was allowed by the DBAP technique (see 2.3), which is not based on a global geometrical 3D representation as most of the spatialization techniques, but rather on a set of partial, non-realistic 2D representations for distributing sound to several subsets of speakers. This pragmatic and perception-oriented approach led towards a work focusing on placements and local activities of sonic elements, rather than on trajectories. Smalley’s notions of “Motion and growth processes”[8] are an adequate way to describe the spatial behaviours implied in this work. Movement in itself is thus seen to be a behavioral element of the sonic elements to which it is applied, to be perceived alongside its timbral qualities.

## 3.4. Performance

One other important aspect of the work process is related to the fact that both composers are engaged in the actual performance. This forced us to articulate a range of issues relating to performative as well compositional aspects of the piece.

One of the first challenges was related to identifying and strengthening the individual character of the two sound producing performance setups. Allowing for different roles between the performers on stage, both in a spatial sense and regarding their respective sonic materials and gestural language proved important. The concepts of gesture and movement/activity kept reoccurring in this debate.

To clarify the difference between the physical gestures used to instigate or generate sound and the musical/sonic gesture, we defined *gesture* as the physical element and *figure* as its sonic counterpart.

An important goal was then to develop a work that includes both the connection and the disconnection of the relationship between the physical gesture and the sonic figure. The relationship between these two, as stated by Smalley[8] imply that, “if [figures] become too stretched out in time, or if they become too slowly evolving, we lose the human physicality. We seem to cross a blurred border between events on a human scale and events on a more worldly, environmental scale.” Based on this we have aimed at a perfor-

mance where relation is sometimes one-to-one, sometimes many-to-one, sometimes not related or reciprocal.

The two performance set-ups are also fundamentally different in design and essence: Habbestad performs using an historical instrument with definite preconceptions regarding both causality and sonic result. Baltazars instrument generally has a less direct causal relationship between gesture and figure, in particular by allowing the simultaneous management of several sound sources and then blurring any expected causality.

We see this issue not only in relation to actual sound production, but as a relationship that can be used as a composition parameter on top of the purely sonic material. Clearly stating what Smalley calls the "source bonding" poses a particular challenge in this work, as unbalance in this respect can interfere with the way the two different gesture/figure-relationships are perceived by the audience.

#### 4. CONCLUSION

One third into the development of this work we are starting to see the contour of a working method, the pros and cons of a collaborative artistic process and a long list of issues to adress. A first impression would be that the collaboration has forced us into a level of verbalisation not normally required when working alone. In one aspect this also affects the actual listening process, as the development of a common descriptive language obviously also colours the way in which we listen to sonic material. Furthermore, the dialectic nature of the work process, where ideas, concepts and also sounds are stated, discussed, evaluated and redefined by two people in a continuous way, has proven to be a very valuable artistic filter.

One of the main challenges in the further development of the work is both conceptual and practical: making the audience perception of sound and its relationship to gesture become an integral part of the composition process. In other words, developing ways to connect the sonic figure, its human originator and physical gesture, and the actual topological placement of the sound. The more obvious remaining challenges relate to the continued work on material development, refinement and experimentation with different formal strategies in order to develop more and stronger temporal relations on intermediate levels.

In regards to the instrumental development, a range of potential improvements and adjustments has been raised. Generally, the Respirator needs to develop its gestural interfaces in order to facilitate a more immediate control of certain parts of the signal processing. Z may need to change its set of interfaces to less versatile and more expressive inputs, in order to improve the gesture/sound connection. MSpace needs further refinement in order to allow more intuitive and immediate manipulation of sources and groups, in particular concerning the speakers weights.

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<sup>5</sup><http://jeffcarey.foundation-one.org/>

<sup>6</sup>[www.notam02.no](http://www.notam02.no)

<sup>7</sup><http://www.platiforme-virage.org/>