ACUSMATRIX

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**CONTENTS**

1.SYNOPSIS / CREDITS

Acusmatrix is a two-entry matrix conceived for the interaction of human motion and sound in continuous transformation. In this case acquires the shape of an acusmatic bird treaty for one dancer and tridimensional sound theater in sixteen channels.

The piece is performed by an hybrid quintet composed by a performer (the dancer) and four species of european birds (capercaillie, blackcap, ptarmigan and little grebe), whose chants rotate and transform creating a genealogy of sound characters that are perceptually connected.

The goal of the piece focuses on the correspondence and the interaction of dance gesture and sonic gesture.
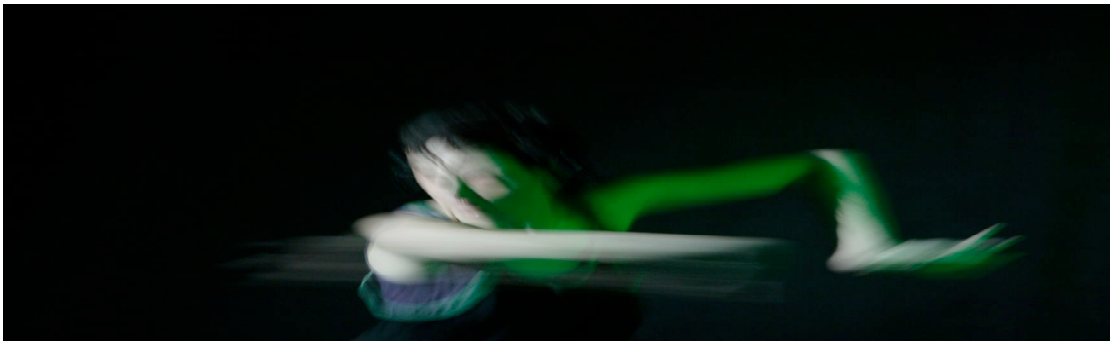
CONCEPTION AND IDEA: Pablo Palacio / Muriel Romero

CHOREOGRAPHY AND PERFORMANCE: Muriel Romero

COMPOSITION : Pablo Palacio

SUPPORTS : La Casa Encendida, Universidad de Alcalá de Henares
                    and Cie Gilles Jobin.

DURATION: 40 minutes.

2.FORMAL AND THEORETICAL ASPECTS

2.1 General Description

Acusmatrix is a creation for one dancer and sound design in eight channels. The focus of the piece lies in the correspondence between dance gesture and sonic gesture.

The piece concretizes the attempts of Rudolf Laban of making a three dimensional geometric and morphodynamic analysis of dance motion, placing the dancer in a virtual space of cubic proportions.

Following this line of thought Acusmatrix places the dancer in a three dimensional sound space interacting with sonic objects that are successively transformed according to their trajectory and dynamic morphology.

The sonic universe of Acusmatrix is constructed upon digital transformations of birdsong of european species developed trough algebraic structures (residual classes) that articulate time, spatial motion and timbre. These structures form the basis of a method for constructing and metabolizing symmetries in dance motion.
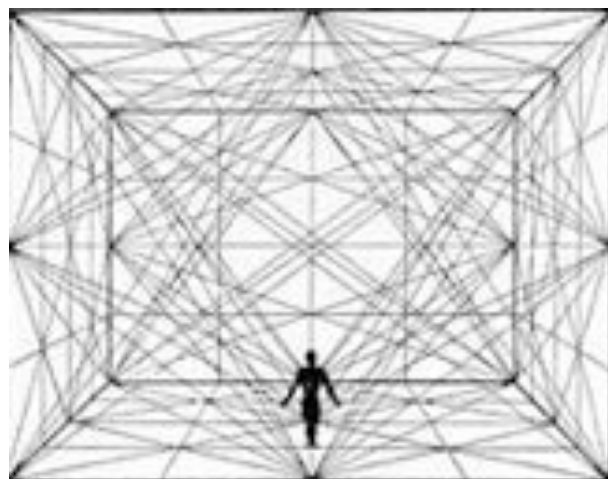
2.1 Dance gesture, sonic gesture and acusmatic.

Rudolf Laban synthesized the infinite motor repertoire of the human body in eight basic efforts, one for each vertices of the cube: Pressing, Flicking, Wringing, Dabbing, Slashing, Gliding, thrusting y Floating.

Laban plotted the space and temporal dynamics of these basic efforts or gestures as a function of time (sudden-sustained), space (direct-flexible) and weight (light-strong) in a three dimensional graph he called the dynamosphere, making an analysis of the inner energy flow involved in motor activity.
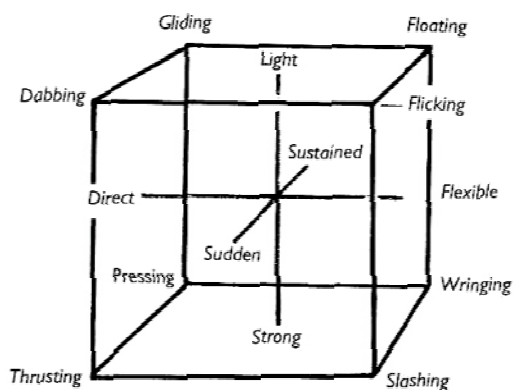
These and other aspects of Laban notation may also be considered in relation to the nature and articulation of sound objects. In a music concert we observe how the sound that we listen to depends on the sensorimotor coupling of the player with the instrument. For instance, a violin pizzicato is caused by brief strokes (dabbing) and is light and sudden, whereas a double-bass glissando slides (gliding) and is strong sound object that can be sustained in time.

On the other hand, there are musics in which we don't see the gestures that cause the sounds, those are imagined or inferred and their ambiguous and mysterious morphology make us doubt about their origins. This is the case of acusmatic music, designed in most cases by electroacustic means and to be diffused in public using different configurations of loudspeakers that emphasize the character of the piece.

- *Acusmatic: name given to the disciples of Pythagoras that during five years listened to his lessons hidden behind a curtain, unable to see him and observating the most rigorous silence. Adjective: it is said of a noise or a sound heard without seeing the causes of its origin.*

In the acusmatic conception masking sound sources produces an inter-sensorial dissociation between ear and eye, and focus our perception in the nature of sound shapes. In Acusmatrix dance fills metaphorically the visual void, drawing back the pythagorean curtain and completing the perceptual experience through a new audiovisual association.

In this manner Acusmatrix becomes an experimental matrix designed in order to establish a gestural relation between human motion and sound, relying on the existence of a common gestural substrate for both phenomena. Elements of both perceptual domains (ear and sight) with a morphodynamic affinity are associated and stressed in different levels:

-<u>Geometric</u>: Sound objects move around according to the trajectories outlined by the dancer, constructing geometrical shapes that are manipulated and transformed by means of linking points in the space delimitated by the loudspeakers.

-<u>Stability-instability</u>: The dancer oscillates between balance and unbalance, analogically sonic objects evolve from order to chaos either in the temporal plane (periodic-aperiodic rhythms), or according to their spectromorphology, that is, moving between harmonicity and noise (we perceive as noise those sonic objects whose spectra is totally unstable, and we say that are harmonic those sounds in which the physical components or frequencies are stable.)

-<u>Morphodynamic</u>: It is directly connected with the efforts, the energy-motion trajectory that creates and models sound and movement, how it is originates, sustains in time and vanishes. Dance motion and sound are conceived as organic structures that follow analogous growing processes.

These levels of gestural interaction do not act isolated but combine and mutually reinforce. The geometric space motion depends directly on the morphodynamic trajectory, and both levels are affected by stability. For example, an object that is 'floating' in space conveys a certain geometry, different from other that is 'thrust', and would be more stable than other object that is being 'flicked'.

2.2 Constructing symmetries using algebra: dance and residual classes

In dance as much as in music the organization of symmetries (in the spatial domain) and periodicity (in the temporal domain) plays a fundamental role, on which relies the ability of the brain to recognize structures with sense (pattern recognition). Watching a dance piece we identify spatial identities (symmetries) and identities in time (periods), they act as a plot guiding our perception and activating our intelligence. We find an analogy with this process in astrophysics, searching with gigantic radars signals of intelligent life in the shape of symmetries or periodicities among the chaos of frequencies that come from outer space.

Algebra, and particularly residual classes with the help of the Logic of Classes, allow us to formulate a theory to construct symmetries as complex as we want them to be. This system was already introduced in the sonic domain during the 70's by Iannis Xenakis (Sieve Theory), however its implementation on dance motion represents a novelty and a challenge. Sound design in Acusmatrix in its temporal, harmonic-timbric and spatial planes is articulated through residual classes. These structures are used to develop dance motion and form the basis of a formalization of the interaction between sonic gesture and dance gesture.

2.3 Sound transformation in Acusmatrix

The necessity of continuity exerts so much fascination on the imagination as the idea of transformation or change of shape. At the same time we search for connections with our origins we aspire to transform ourselves in order to achieve personal fulfillment. Darwing established a continuity between the multiple transformations that compose the chain of being, and the fact that there's still a missing link raises many questions….In this manner it's not a surprise that the most relevant aspect of any composition is the way in which the material is transformed, and that sometimes we discard interesting ideas in favour of a better continuity or fluency.

The sonic universe of Acusmatrix is generated by digital transformations of birdsong of european species. Why this choice? Birds are probably the most stunning sound virtuosos over the planet, and their repertoire covers a great spectromorphological range of absolute contemporaneity, moving between noise and delicate pitched tones.

Acusmatrix presents a sound generation method with a tree structure. Starting with a sound (birdsong in this case) the transformations produce successive metamorphosis of the original, creating a genealogy of perceptually interconnected sounds with multiple junctions and branches.

These transformations comprise the multidimensionality of sonic space and reflect the fact that sound is a continuum in constant transformation. Too often we listen to electroacustic music composed under the instrumental-notational model consisting of static objects and ignoring the potential of computers for transforming any sonic material with the only limit of the imagination.

The conception of sound as an organism in constant evolution has a great adaptive potential when working with the body and keeps a close relation with the organic nature of dance itself.

Sound transformations in are designed with C.D.P. (Composers Desktop Project) software.

3.SOME STAGE CONFIGURATIONS
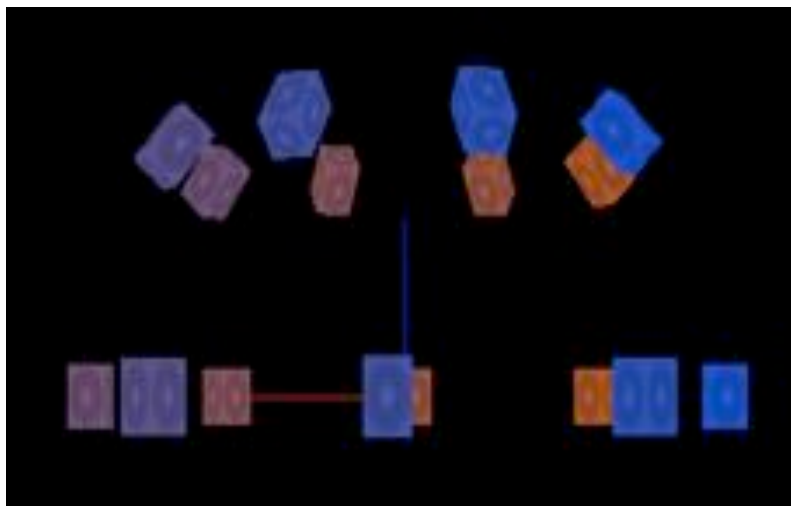
Configuration [A]

A three dimensional sound installation composed of two rings of loudspeakers one above the other. The loudspeakers of the higher ring are orientated downwards with an inclination of about 35º, as the picture shows. Both rings are around the audience which disposed around the stage where the dancer moves. The audience may rotate around the stage, transforming in this manner the perspective of dance motion as well as the sound image perceived at each spot of the installation. This configuration requires a space of great diameter to succeed, so there's enough space between the audience an the loudspeakers.
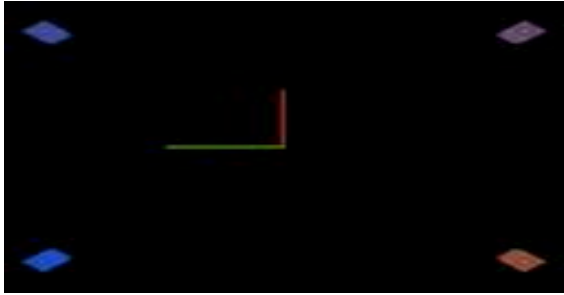
Configuration [B]

It is composed of two sets of loudspeakers. On one hand, a ring of eight surrounding the public, which is placed in front of the stage (lower part of the graphic) On the other hand, the dancer (in the stage) has another set of four loudspeakers around her (higher part of the graphic). This is a two dimensional sound installation. Another interesting variation of this configuration consists of positioning another stand of public in front of the existing one (and with the stage between both of them). The sound objects swing from one stand to the other interacting with the dancer in a sixteen channel sound space.

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3.1 Considerations concerning stage configurations

The sixteen channel array (Configuration [A]) introduces height, so it is more suited to a sonic tridimensional analysis of dance motion. However, in the cases where technical resources lead us to choose any of the other options, it's necessary to point that it is possible to generate an effective three dimensional sound image even in stereo, as long as we handle properly the psicoacoustic principles involved in determining the position of a sound object. Actually what we do is to generate an illusion of motion of sound sources (loudspeakers do not move around the hall).

3.3. Lights

Acusmatrix is composed of several scenes with sonicblackouts that reinforce the acusmatic nature of the piece. The flow between white light and sonic blackouts is automated and articulated following residual classes.
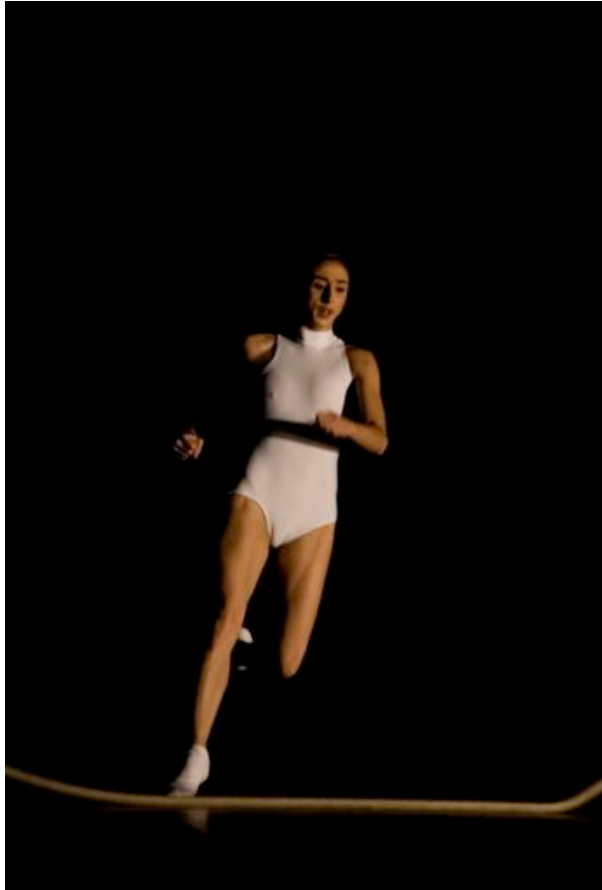
4.ARTIST'S BIOS

MURIEL ROMERO
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Training
Ecole Rudra Bejart
Real Conservatorio de Madrid
School of Lola de Ávila.
National Ballet School. Spain

Prizes
·Prize Critic/Press, Internacional
Ballet Competition, Moscow 1987.
·Prix de la Fondation de Paris, Prix
de Laussanne,1986.
·1º Prize, National Dance
Competition, Barcelona 1985.

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Companies
Dresden Semper Oper Ballet. First Soloist.
Gran Théatre de Genéve. First Soloist.
Compañia Nacional de Danza (Nacho Duato).
Deutsche Oper Berlin. First Solist.
Nationaltheater Mannheim. First Soloist.
Bayerisches Staatsballet Munchen. First Soloist.
Compañia Nacional de Danza (Maya Plysetskaya).

Dornröschen (P. Wright), Ein Sommernachtstraum, Der Nussknacker (J. Neumeier); Raymonda, Paquita, Don Quijote (M. Petipa); Chopiniana (M. Fokine); La Fille mal Gardée (F. Ashton); Napoli, La Sylphide (A. Bournonville); Petrushka (H. Mandafunis); Serenade, Symphony in C, Who Cares?, 4 Temperaments, Thema und Variationen, Concerto Barocco (G. Balanchine); Sarcasm, 5 Tangos (H. van Manen); Arenal, Duende, Coming Together , Cautiva , Mediterrànea, Cero sobre Cero, Remansos, Por Vos Muero, Self, La Floresta (N. Duato); Petite Mort, Sechs Tänze (J. Kylián); Herman Schmerman, In the Middle, Somewhat Elevated; Enemy in the Figure (W. Forsythe); Kir (O. Naharin); Bad Blood (U. Dove); Paradise (Saburo Teshigawara); Romeo and Juliet, The Nutcracker, The Third Eye (P. Touzeau); Vertigo Maze (S. Celis); Fee der Lebendigkeit/Rubinfee, "Dornröschen" (A. Watkin nach M. Petipa); Peter Funk, Bochorno, Orlando (C. Aznar).

Projects

Unrewegsteatrher .Heidlberg.

La Anonima Imperial .Barcelona.

Compagie Buissoniére .Laussanne.

La Ribot, (as an extra) .Madrid.

9x9.. C de la B & Sasha Waltz .Berlin.

Coreographies

At the moment 2. Teatro La linterna Magica. .Praga.

Cabaret Pedrolo. Compañia de Teatro La quadra Mágica .Barcelona.

Acusmatrix. La Casa Encendida. Madrid

Catexis, Comunidad de Madrid

Theatre creations

"Nadia Monologue" (P.Riera) .Teatro La Riereta. Barcelona.

"Panoramas" (P.Riera,N.Yanko) .Compañía de Teatro Panoramas. Barcelona.

"F.F.S.S." (M.Feijo).La Casa Encendida. Madrid.

Teaching

· Professor of Technologies of the body at *Master in Performing Arts and Visual Culture*, Universidad de Alcalá (Madrid).

· Conservatorio profesional de danza. Madrid.

· Escuela Camargo. Murcia.

· Conservatorio de danza . Praga

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Academic Formation

·Trumpet, composition and orchestration at E.M.C.

·Synthesis and sound transformation with Trevor Wishart and Jean Claude Risset at C.D.M.C.

·University degree in psycology and psicoacustics at Universidad Complutense de Madrid.

Ensembles

·SOF (2002-2005). Sonic art project based on the explanation in sound of geometric and algebraic structures.

·TUNYI (2004-2007) electroacoustic ensemble that combines improvisation with some innovative sound transformation techniques.

Festivals,theates….

LEM (Barcelona)

La Casa encendida Territorio Eléctrico (Madrid, Spain)

Rising Stars (Sevilla-Cádiz-Jerez, Spain)

Salle des Eaux-Vives (Geneve, Switzerland)

Grange de Dorigny (Lausanne, Switzerland)

Madrid Jazz Festival / Getxo Jazz / Ibiza Jazz Festival (Spain)

FIT (Belo Horizonte, Brazil)

SESC Consolaçao (Sao Paulo, Brazil)

Luzern Théâtre La Fourmi (Luzern, Switzerland).

Centro Párraga (Murcia, Spain).

Recordings

Tunyi "*Autoplástico*" CD   Ecléctica Madrileña y Nuevos Medios (2006)

Sof   "*Sof*"   EP   Metástasis (2004)

Dance Compositions

·*BlumenKabarett*,(2006-2007). Composed for the Compagnie Buissonnière-Lausanne. Switzerland

·*Androgina de Minas (2007-2008)* .Composed for Compagnie Buissonnière-Lausanne. Switzerland

·*Acusmatrix (2007-2008)*. Created under a period of residence established between La Casa Encendida and Universidad de Alcalá de Henares. Spain

·*Catexis (2008)* . Created with the support of a Scholarship for creation and development of Scenic and Cinematographic Arts of La Comunidad de Madrid. Spain.

·*Giseliña (2008)*. Produced by the CCG (Centro Coreográfico Galego). Spain

Other sonic Art Pieces

·*Autopoiésis* (2006-2007). Premiered on Alter-Arte 2008 (Murcia, Spain)

·*Silem* (2005-2006). Included in the CD of TUNYI "Autoplástico". (La Ecléctica Madrileña y Nuevos Medios)

·*Irratio* (2005). Premiered on Territorio Eléctrico 2005 (La Casa Encendida, Madrid).

Workshops, lectures, software

·Professor of Sound Space at *Master in Performing Arts and Visual Culture*, Universidad de Alcalá (Madrid).

·Workshop on sound transformation (Centro cultural Puertas de Castilla , Murcia)

·Workshop on harmony and composition in the frame of new digital technologies (La Casa Encendida, Madrid).

·Sound transformation in *Acusmatrix:* construction of a three dimensional sound theatre (Lecture).

·Structural aspects of Acusmatrix . CAIRON 12 Journal of Dance Studies 'Body and Architecture'. University of Alcalá.

·Tester and Introductor in Spain of sound transformation technology C.D.P (Composers Desktop Project),

5.REFERENCES

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Harrison, J. 1998. " Sound, Space, Sculpture: Some Thoughts on the 'What,' 'How,' and 'Why' of Sound Diffusion and Related Topics." *Journal of Electroacoustic Music*11:12–20.

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Schaeffer, P. 2003. *Tratado de los objetos musicales*. Alianza Música

Smalley, D. 1997. " Spectromorphology: Explaining Sound Shapes." *Organised Sound* 2(2):107–126.

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Xenakis, I. 1971 *Formalized Music*. Revised Edition: Pendragon Press(1992)