

SPACE, SOUND AND ACOUSMATIC MUSIC: THE HEART OF THE RESEARCH

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Acousmatic, perfect testing ground for spatial perception.

The listening conditions of acousmatic music (no real established sound source) are approaching to those of a blind person who senses space by fine listening acoustic qualities of his physical environment.

The "eyes closed" abolish the physical limits of the place, they allow the imagination to deploy its spatial sensations.

Species of Spaces: The four main spatial categories.

Four categories of space emerge from this particular practice of interpretation and knowledge of the acousmatic repertoire: The "surround space" immerses the listener in a "bath" and is opposed to the "sound source" space which localizes sounds; the "geometry space" in a work structures plans and volumes. These three categories relate mostly to multichannel. The fourth, "Space illusion", consciously or not, the subject works stereo format, which creates the illusion of depth of field on the screen of two speakers.

Ambiophonic Space.

MUS examples:
Léo Küpper, *Litanea*

IMA examples:
Leo küpper, cupolas

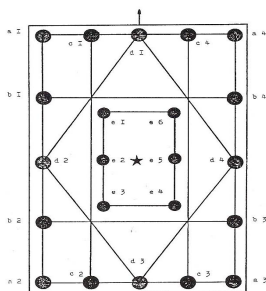


Figure 1
Maison de la Culture, Grenoble, France, February
7-13, 1973

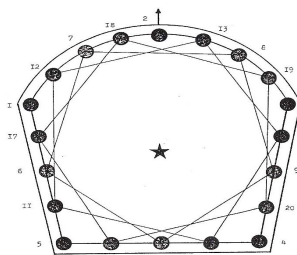


Figure 2
Beethovenhalle, Bonn, Germany, November 22-28,
1975

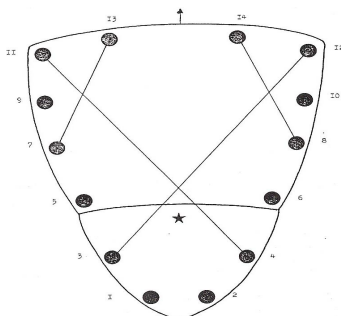


Figure 3
Auditorium, RAI, Rome, Italy.
Festival Nuova Consonanza, Dicembre 8, 1982.

Figure 6
View from the tempered sound dome (half dome
projection)

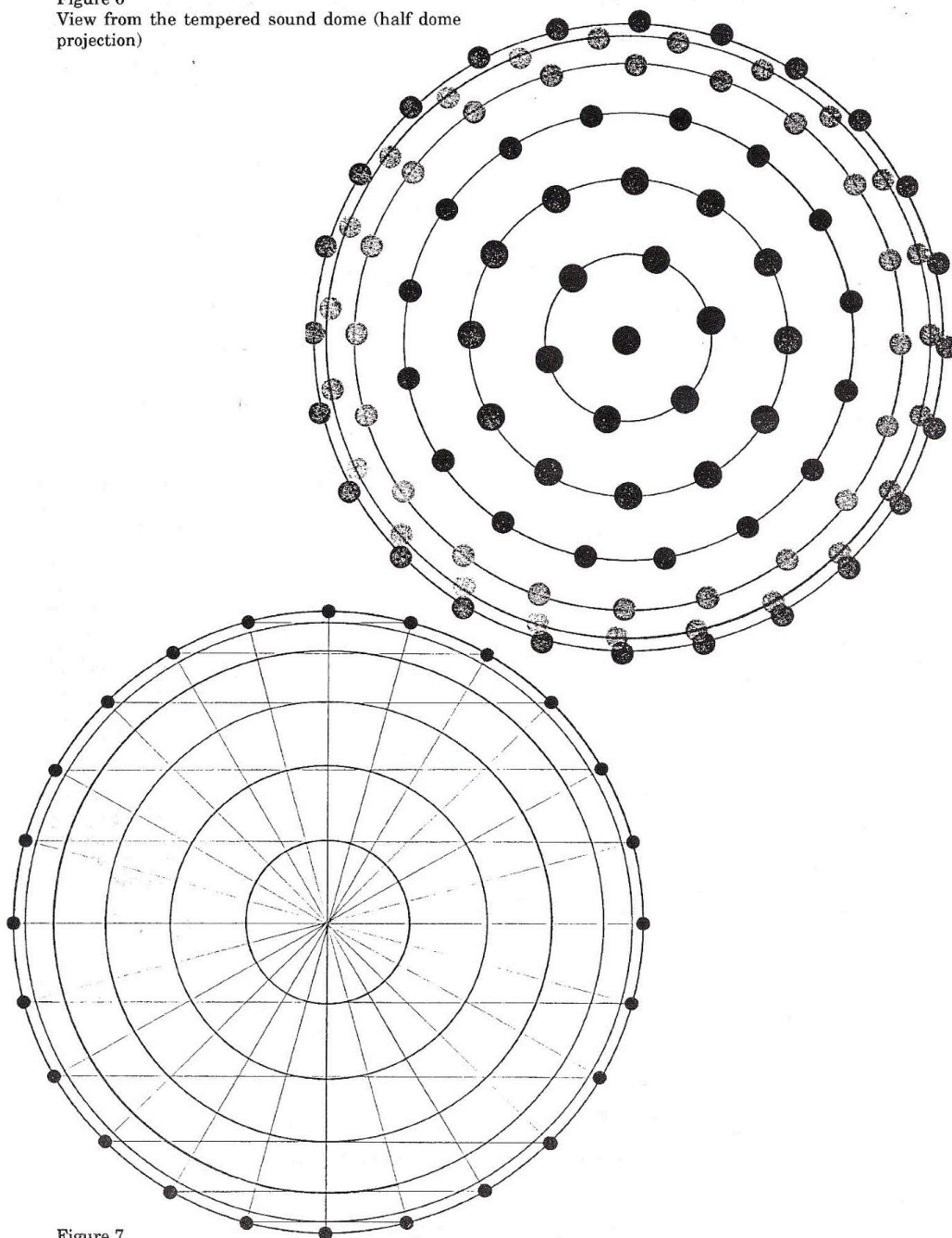


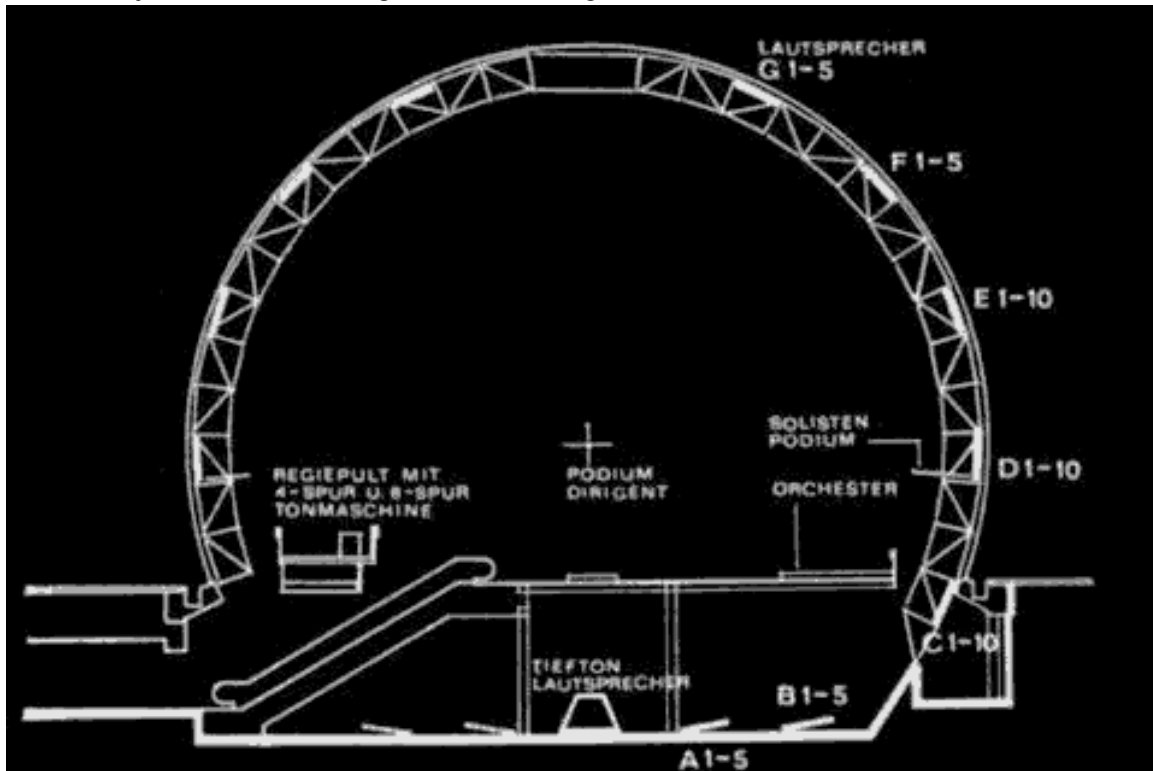
Figure 7
Side view from the tempered sound dome (half dome
projection)

It is a space in which we cannot determine where sounds come from, the auditor bathing in a diffused ambience. It is its listening that achieves a "mixing" of all events given to hear.

One can establish an analogy with Byzantine churches: these include domes covered with gold tesserae which redistribute equally the little ambient light across the whole church, but no source is localizable.

For ambiophonic diffusion, we surround the audience with identical speakers with a relative equidistance to each other so that there is no acoustic hole. The encompassment is done upon every plans; the sphere is the ideal model. If the encompassment is on one plane, then the circle becomes the right model. The Dolby or THX cinema systems can also be classified in this category: three different channels on the screen but the sides and rears are sharing one or two channels.

Projection: identical loudspeakers surrounding the audience, little movement with the console.



Section of the sphere of the German Pavilion at the World Expo in Osaka in 1970 for the exclusive listening to the music of Karlheinz Stockhausen (1928-2007)

Source Space : Pointillism

MUS examples :

Pierre Henry, *concerto pour une porte et un soupir: étirement /*
Elsa Justel, *Débris* (8)

IMA examples :

Pierre Henry, pour *Histoires naturelles*
radio france, salle Olivier Messiaen 1997

Opposed to the previous one, this type of space pinpoints the source of the sound, which can be mono, bi or multipist (but not stereo). The movements and the spotting of the sound are what matter. We may also want to make the audience feels the differences in color, power of each speakers.

Pierre Henry was probably the first to explore the musical possibilities of this philosophy of space, during the compositional process and the concert both. In this context he often opposes the right/left channels and tracks (biphony) using the place's geography to organize it.

Today, the most common use of the source space is the multiphony from a multi-track player. It involves placing sounds with attack transients marked enough to locate them even if they are very short. The composition then becomes a pointillist environment, playing with masses, the occasional phrasing and variations of densities.

Multipist dialogues and sequences overlays assigned to the same speakers are another kind of the source space aesthetic, which is highlighting sonic characters or counterpoints.

Projection: identical and diverse range of loudspeakers, situations choices, little movement with the console.

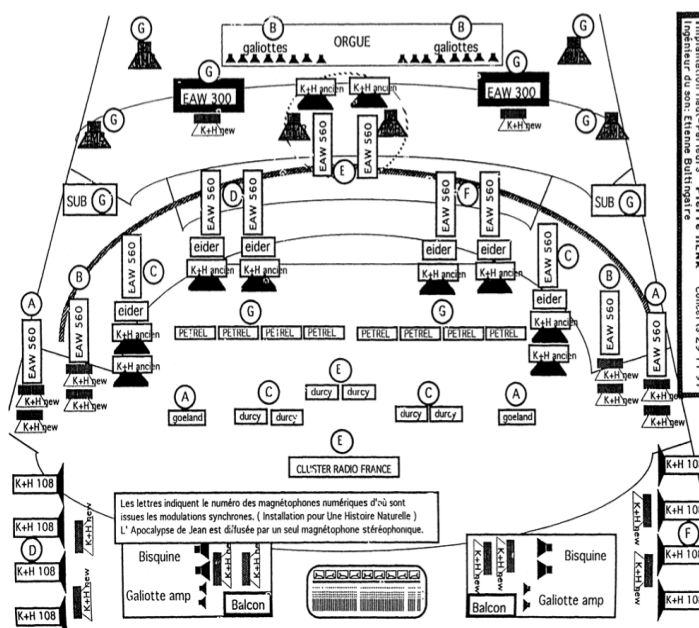


Figure 1 : dispositif de P.Henry pour la création d'Histoires naturelles Paris, Radio France, salle Olivier Messiaen, 1997

Source Space : Movement

MUS examples:
Stephan Dunkelman *métharcana* 8 channels / stéréo

IMA examples :
Christian Clozier, *Cybernéphone*

Anything in movement is also part of the source space, audible trajectory in outer space, therefore generated by the interpreter or written by the composer on the multi-track tape (inner space). As Aesop's tongue, the movement itself can be the worst or the best thing. Indeed, it has always seemed useless to try to save a poor music, without internal energy by applying movements, external agitations. The movement becomes a non-integrated ornamentation, not justified by the musical structure or phrasing. But if we consider the musical expression from an energy point of view, the trajectories can then strengthen the internal energy of sound. Western music history is populated with works that are giving importance to the agogy itself as a factor expression (think of Monteverdi and his *stiithe concitato*, at the figuralism, particularly in the work of Johann Sebastian Bach, the *Symphonie Fantastique* by Berlioz) and a structural factor (Stravinsky and his *Rite*, Honegger's *Pacific 231*, Scelsi ...).

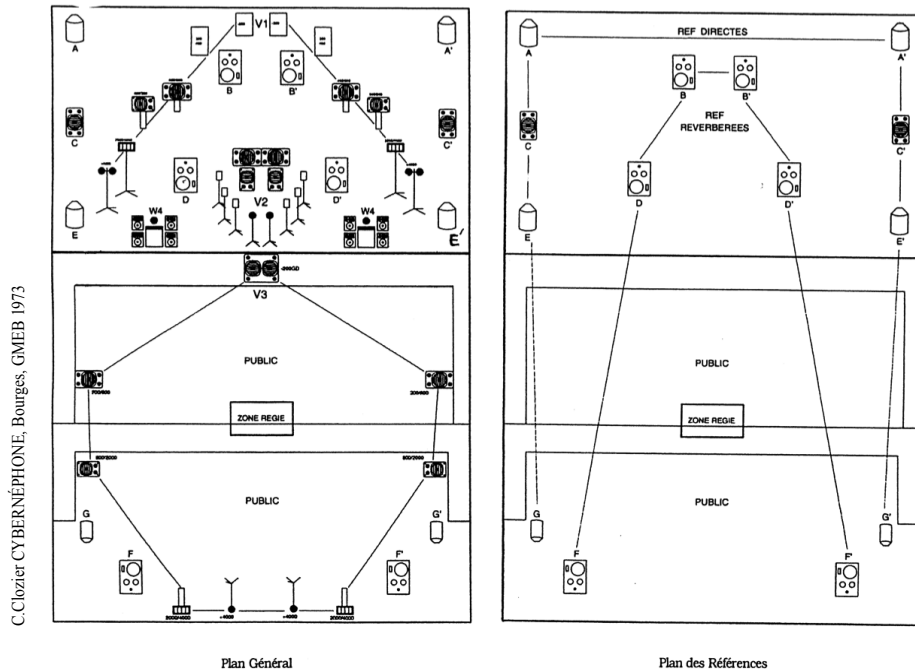
If you would forgive me a banal example, a circumduction around the audience or any other pivot will highlights to the ears, any rotary motion of a spinning top, a swivel, a repetition. Even, the convolutions trancy of a "breath coil" in a given location will specify its capricious nature.

Finally, the application of a swinging spatial movement to a neutral and abstract sound, gives it a special meaning, that of a lullaby for example. It may be recalled here how much time, space and motion are related: fast or slow rotation does not generate the same meaning, and if it gradually moves to a faster *tempo*, it changes its shape and becomes a spiral.

This movement space, if not free, would have especially an ornamental or metaphorical function to sustain : expressive sounds themselves in which it provides a spatial support.

In the nineteenth century, timbre and melody maintained the same ratio.

Projection: identical loudspeakers (multichannel) and various colors, movements strengthened or created at the console.



Geometry Space

MUS examples :

A. Vande Gorne , TAO:Terre (8) 1.Début 2. 16'45 to 19'30

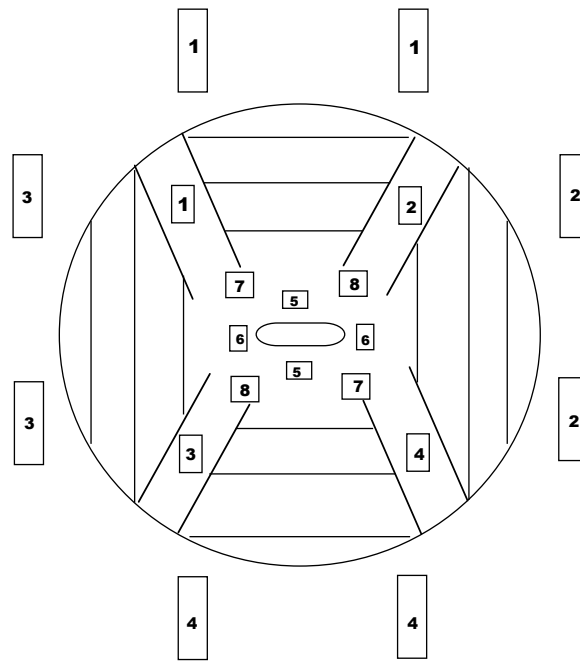
**IMA examples : schéma TAO : terre
Lyon, jardins de la villa Gillet, 1991**

If we consider the space from a structural point of view, we can imagine it as the place of intersection of different *lines* and *plans*, as surface or volume interspersed with lines that are bisectix, oblique, vertical, lateral, etc. From multiple sources (multichannel), think the sound in terms of *composition of the space* mono, bi, quad, triphthe stereo, dual quad, octophonic ... with any combination possible, applied to a single acoustic chain or many of them, simultaneously or sequentially, in close or distant plans, this is to give to space the equivalent parameter status of the other four. The movement is part of the form when it becomes figure, repetition, transition, rupture, trigger, etc. Here, space geometry is therefore not a carrier; it is a real and abstract musical object which leads listening and structure perception with its evolution over time.

The space organized, controlled, requires providing a diagram of the diffusion system by which spatial patterns will be chosen to appear on the tape, for example, within the sound systems of specific places or installations. Too much complexity (number of tracks, the possible spatial variations) will affect the transparency of the architecture. My current perceptual experience is limited to 4 movements or 4 differentiated geometric spaces.

The disposition a priori, writing space for itself from multiphonics point sources generates a stabilising musical thought which binds the space to the form, so once again, to the time.

Projection: identical loudspeakers and diverse choice of situations by sequences.



Annette Vande Gorne, Création de TAO
Lyon, jardins de la villa Gillet, 1991

Illusion Space

MUS examples :
Christian Zanési, *stop The horizon*

IMA examples :
Bayle 1^{er} acousmonium, pour
The Expérience acoustique, espace Cardin : 1974

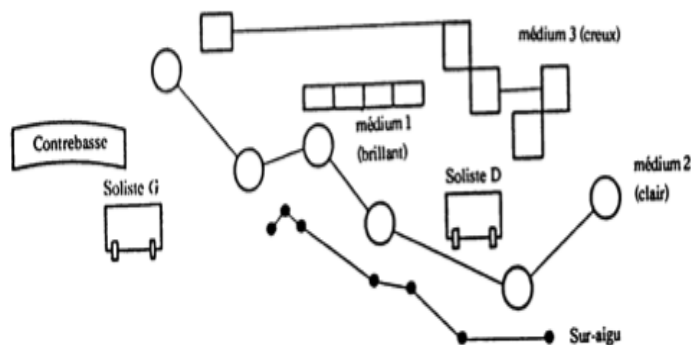
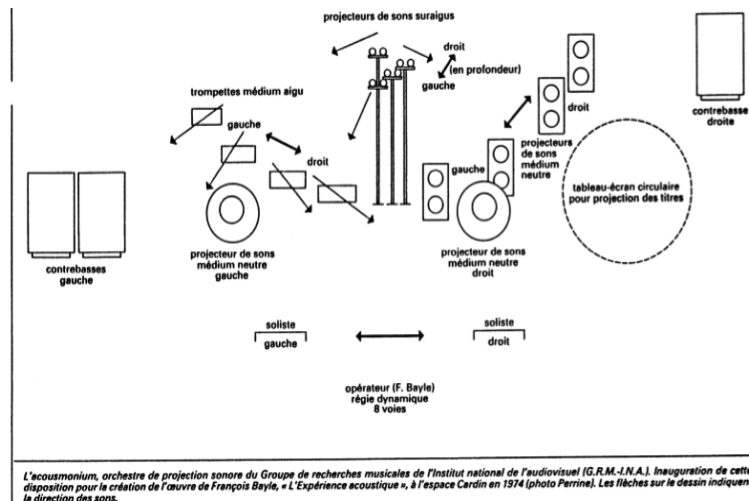
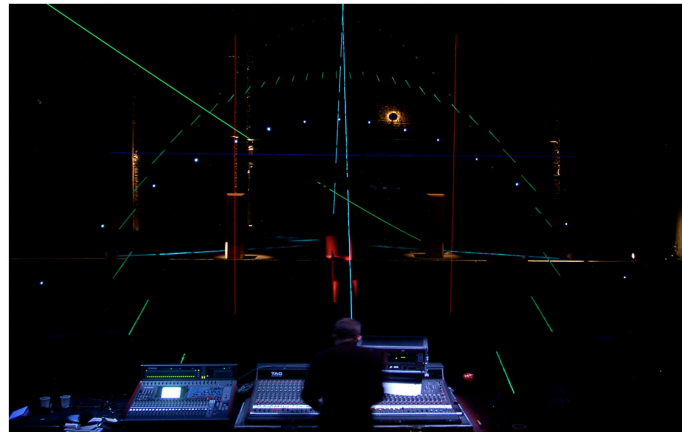
It is the illusion of depth of field by the stereo, which if respected throughout the entire chain of production, will be projected on "screens phase" speakers. The sound is no longer perceived as a real object, but as an image, a representation. We enter the world of media coverage, the one of the photos, the film, the video, the radio...

There is thus perspectives creation, depths plans to be multiplied, highlighted by multiple phases' screens (pairs of loudspeakers), by their staged disposition at least near placement, median, distant and at least very large of a caliber width, medium and very thin. One may play different registers of caliber width on a single plan or in volume to enhance the center of a wide phase's screen (static) or dynamically, to operate a movement of expansion or contraction.

The direction of the loudspeakers compared to the audience specifies or not the contours, edges of sounds (as in photography) as they converge towards one another and towards the center of the cone of the audience's presence, or in the contrary diverge, as they project live sound (and are built to be directional) - the projectors - or, conversely, radiate the sound towards reflective surfaces, indirectly, or filling all the space - the radiators.

The color, spectral response of the transducers (from low to hyper high frequencies), also plays a role. They are divided into five families: the basses, called "double basses" (10 to 400Hz) in a very wide stereo that covers the whole field of the room, or in the center if there is only one "subwoofer"; the "hollow" mediums (250 to 1000Hz) used to fill the space; the "clear" mediums (400-3000Hz) responsible for maximum audibility of the message, and especially of the human voice; the "bright" mediums (3000 to 8000Hz) reinforce the presence of microscopic life of sonic beings; finally, a multiplied group of very high frequencies loudspeakers or tweeters (8000-16000 Hz) which specifies the edges. We will use small tweeters to refine the contours present in the audience. The very high pitched speakers or trumpets are used to help locate a set placed far away. The bass is diffuse. Speakers of poor quality (hollow medium) will play smoothly a role of diffuse mass (radiators).

All combinations of placement, caliber's width, color and directivity give to each pair or group a different musical role, like an orchestration: soloists (pair of references, often in close and converging focal length), mass (distribution of loudspeakers in : reflection, on a large area), referential stereo (large width caliber, all frequencies), double basses (bass), effect (vertical stereo, ceiling, presence in the public etc.). This projection instrument designed to enhance existing space on the tape (the internal space) and reach the imagination and emotion of the listener was developed by François Bayle in 1974, who named it "acousmonium" last step of the acousmatic production, the GRM acousmonium counts in 2002 more than 80 speakers. The acousmonium of *Musiques & Recherches* (Brussels) founded in 1980 has more than 70 speakers in 2014. It combines the interpretation of the illusion space with the one of the multiphonics space source. Projections: miscellaneous loudspeakers, spatial figures and situations of the internal space reinforce on the console



The spatial interpretation

The console of projection (fader, multitouch surface, interactive gestures etc.) is a musical instrument and its "operator" a performing musician. This requires him some virtuosity (conditioned by the speakers system he has chosen, and the ergonomics of the sound projection instrument as well), stylistic knowledge of the repertoire, graphic statement of the simplified works and relevant to the spatialisation and maximum memorization of the work.

The interpretation of acousmatic music tends to bind different spatial figures that reinforce the writing of the work; the figures highlight existing or create new ones. The stereo works also leave more freedom of choice to the interpreter. Sixteen figures are listed, with their musical function.

MUS examples:

A. Vande Gorne : *Figures d'Espace* : 1 twinkling (1'20), 2 wave (4'14), 3 rebound (7'52) + trajectories in crossfade (8'38)
B. Ferreyra : *un fil invisible* to 2'50 invasion, explosion, disappearance to 9'30 twinkling/ wave, twinkling

Crossfading

Slow or imperceptible transition between pairs or groups of speakers. The gesture must be careful not to dig any acoustic "hole". Start to move up the speakers' faders to be faded in before bringing down the first set of faders, and find a balance point.

Musical function: strengthen existing crossfade on the tape. Change plane or depth caliber. Draw a path by successive crossfades if, for example, this sound evokes a moving object (ball, car, plane, etc.).

Unmasking

Sort of an upside down crossfade from a given mass, we hear the desired speakers' pair or group by reducing the amplitude or removing other speakers. The gesture can be gentle, imperceptible, or brutal, using the mute buttons for example.

Musical function: strengthen existing unmasking effect on the tape. Change plane or depth caliber. To impose on the sound a trajectory by successive unmasking if, for example, this sound evokes a moving object (ball, car, plane, etc.) and that the starting spatial situation is a tutti or a mass encompassing the public.

Emphasis

Highlighting a specific location (the soloists for example) or a group forming a particular space, volume or a new caliber, by slightly increasing the amplitude of the chosen speakers without modifying the others. The amplitude of departure (the basis) is important because it determines the overall level. We balance it from the stereo reference pair (also called "the principals").

Musical function: this approach can be applied to a specific passage of the work or to a general strategy of projection, in which case we slightly open all the main faders (which thus provides the basis) and then we increase some points following the structure or sections of the work, the desired effect on the listener's perception. This is the general strategy of François Bayle.

Emphasis is a soft, light and relaxed way to play on the console (mixing desk).

Sparkling

Fast cascading highlighting operations (and back) in a given mass. Random play. Play of the amplitude within the acousmonium, play on the spectrum (by filtering) in the context of IMEB's Cybernéphone (Christian Clozier, 1973). To ensure continuity, also keep some channels open and fixed.

Musical function: spatial equivalent of tremolo, to create liveliness "inside" a thick and smooth mass by digging, or increasing light spectral or dynamic fragmentations. Highlighting a moment composed by micro montage or pointillist (granular) techniques.

Oscillation

Rapid and regular alternation between two speakers or two speaker groups. Dynamic and spectral alternation. The effect of "vibration" given by a very rapid regularity is only possible on an automated console. An LFO (Low Frequency Oscillator) could serve as a controller.

Musical function: spatial equivalent of the trill, agitation preparing an explosion, a burst, or otherwise, making a living reflux, a wait.

Swinging

Slow and gestural alternation between two speakers or two speaker groups. Dynamic or spectral alternation. Musical function : highlighting the composed musical dialogue, delimitation of spatial landmarks, lullaby.

The wave

Round trip that runs through crossfades or successive unmasking gestures, a series of speakers in a line, such as from the backstage to the front of the stage, all sides, the back of the room and back again to the front.

Musical function: effect of moving mass and predictable unidirectionality. This gesture has the advantage of joining a known agogic archetype.

The Rotation

Circular trajectory between four speakers on stage or, more often, around the audience, with a gesture of slight highlight of each points by successive crossfades. Musical function: evidence of the sound's internal rotation (then we must keep the pace of this internal motion), creating movements, for example, to give a sense of confinement.

The spiral

Circular trajectory on which is applied an acceleration or a deceleration, of which the endpoint would be elsewhere.

Musical function: preparation, announcement, goal-oriented or conclusive trajectory.

The rebound

Quick jump from a point in space to another, from one group to another, from a soloist to a group (and vice versa) by effectuating a quick alternating gesture on the console or by using a set of "mute" buttons. The rebound is even better perceived when both poles are distant.

Musical function: (re)launch on a trigger-sound. Going into another spatial region without any transition.

Insertion / rupture

In an already established area and in a sufficiently long period, sudden shift or overlap (by unmuting) of a characteristic space and/or different caliber. For example: in a large and diffuse mass, insert a directional solo (narrow caliber).

Musical function: rhetorical figure, highlighting written inserts on the tape, accentuation. The rupture can be used as an abrupt and contrasted deviation to another state.

Appearance / disappearance

Unprepared burst or closing from a different spatial state, superimposed on or following the preceding state. The use of mute buttons is the best way to proceed.

Musical function: surprise, "magic", awakening the listening.

Explosion

Sudden passage from a narrow or directional space to a large and environmental space: not diffused.

Musical function: highlighting an eruptive mass, a characteristic and energetic morphology.

Accumulation

Successive addition of planes and/or calibers on top of each other to achieve a spatial tutti.

Musical function: Highlight of a corpuscular sound material (grains) or progressive enlargement of a frame.

Invasion

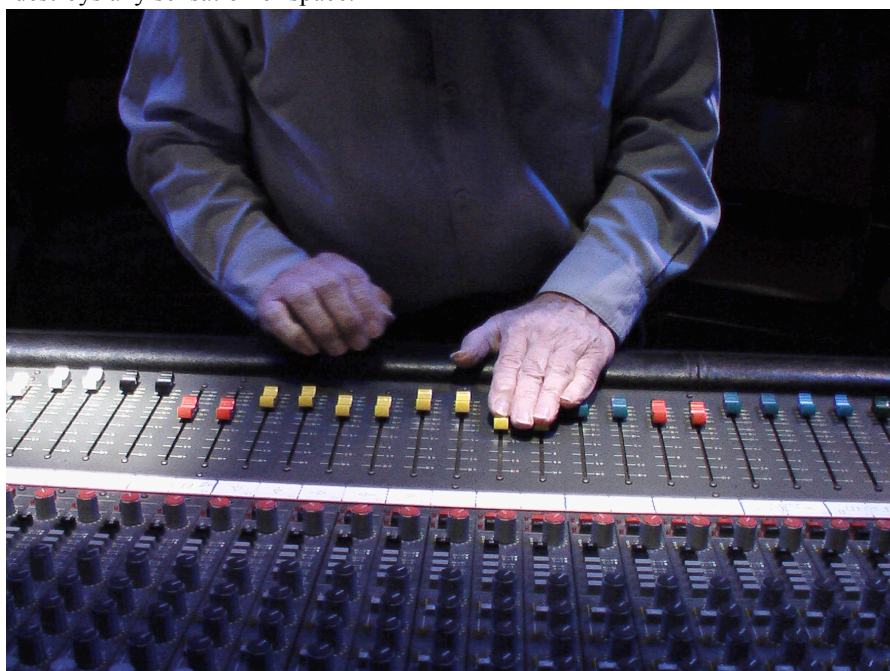
Rapid accumulation, accumulative trajectory oriented towards the audience.

Musical function: as "the arrival of the train at Montparnasse station" by the Lumière brothers, effect of subjective aggression.

Empty/full

Game on the density of the stereo ramp, plans and/or volumes. A stereo ramp bounded by two distant speakers seems "empty", transparent, compared to the same that is "filled" by other pairs of speakers placed on the same front (which is the case Wave Field Synthesis). The same choice is also possible between depth plans or volumes that incorporate additional height dimension, away from one another or filled by intermediate loudspeakers pairs.

Musical function: clarify or strengthen a sonic mass, like a symphonic orchestration can do. Note, however, that a spatial "tutti" destroys any sensation of space.



The hands of Francis Dhomont on the console of projection of Musiques & Recherches

The different types of existing spatial instruments, their specific examples

Some examples, diagrams and explanations show how various systems are designed for spatialisation and the acousmonium especially as it was designed by François Bayle in 1974.

Fig : first acousmonium Musiques & Recherches, Bruxelles, Le Botanique 1984



Ancient and existing instruments (2014) for projection

1. Mobile

The « Gmébaphone », then the « Cybernéphone » of The IMEB (C. Clozier, 1973) France. (It is no longer in office since 2011)

The Acousmonium of GRM (F. Bayle, 1974), France.

The acousmatic machine of GMVL (B. Fort et X.Garcia 1980), France.

The cupolas (L. Küpper 1969), Belgique.

The « BEAST » Birmingham University (Jonty Harrison), England.

The Acousmonium of M&R (A.Vande Gorne 1980), Belgique.

The Acoustigloo of GMVL (B. Fort), France.

The Acousmonium and the acousmini Motus (D. Dufour/J.Prager), France.

The System of CRM (centro ricerca musicali, Michelangelo Lupone) Rome.

The System of CIDM (D. Habault), France.

The Arbre à sons (Bob Vanderbob), Belgique.

The acousmonium of Scime (Christian Eloy), Bordeaux, France

The octophonic system (Dirk Veulemans), Belgique.

The Orchestre de haut-parleurs Miso Music, (Miguel Azguime), Lisbonne, Portugal.

The acousmonium of Arsis-thesis (Dimitri Coppe), Belgique

The Acousmonium Âtr-E [acousmonium d'Art - Temps Réel] (Lionel Kasparian), Marseille, France

The « Hydra » Harvard University (Hans Tutschku), Boston USA

The M2 of Sheffield University (Adrian Moore), England

The « Mantis Matrix » of « novars » Manchester university (David Berezan) England

The system of New adventures in Sound Art (Darren Copeland), Toronto, Canada

The system 32 channels de « the electroacoustic project » (Thomas Gorbach), Vienne, Austria

The system 24 channels of the Huddersfield University (Pierre-Alexandre Tremblay), England.

The acousmonium SATOR of conservatory of Milano/centro San Fedethe (Giovanni Cospito), Italie

The PUTS of Unesp (university of state of Sao Paulo), (Flo Menezes), Brazil

The acousmonium PiedNu of Le Havre (Hubert Michel), France

The BLO : Bremer Lautsprecher Orchesters (2013), Germany

The Klang acousmonium (Julien Guillamat 2013), Montpellier, France

The Alcôme (Armando Balice 2013), Paris, France

The audior (Eraldo Bocca et Dante Tanzi 2014), Novara, Italie

2. Fixes

The Audium of San Francisco, California (Stan Shaff 1963), dismantled and taken by the Univ. of San Diego

The Espace of projection of IRCAM Paris, France

The Tétraèdre of Logos, Gent, Belgium

The wavefieldsynthesis (WFS) of the Teknische Universiteit, (TU), Berlin, Germany.

The SARC (Sonic Arts Research Centre), Queen's university Belfast, Irelande

The acousmonium of the Bauhaus, (Robin Minard), Weimar, Germany

The dom in the cube of ZKM, (Lüdger Brümmer) Karlsruhe, Germany

The dom in the department of electroacoustic music, University of Montreal (Robert Normandeau), Canada.

The audiorama, Stockholm, Sweden.

The studio of ISIB, Brussels, Belgium



fig : WaveField Synthesis and Acousmonium GRM, Den Haag conservatorium, 2013

The multiphonics

MUS examples

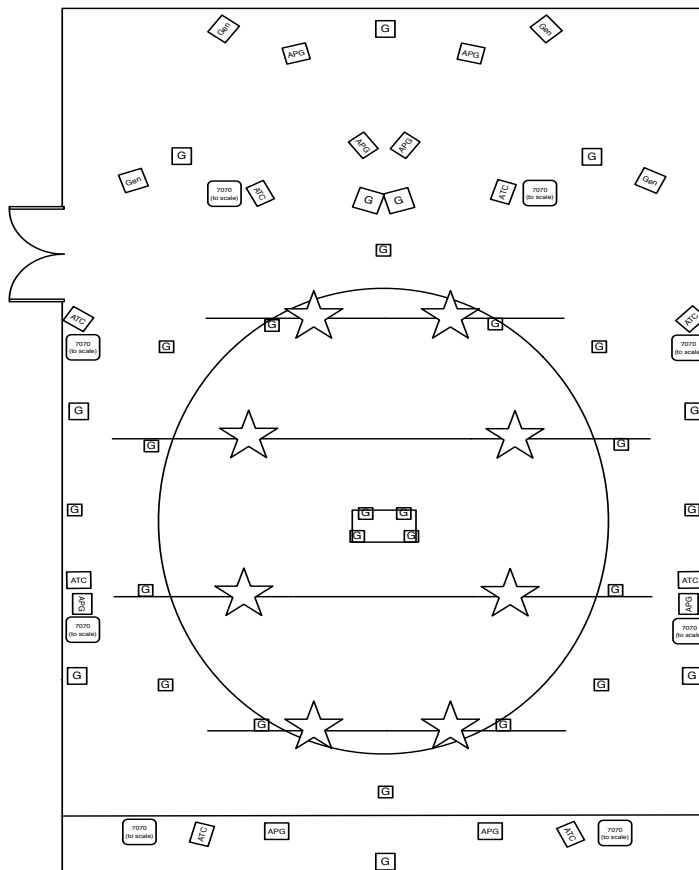
A. Vande Gorne , *Au-delà du réel* (16 channels)
E. Anderson *Solar winds* (octophony)

IMA examples

plan of the system BEAST

The interpretation of multiphonic works raises new requirements with both technical (drivers, interfaces), types of transducers, and aesthetic. Comparison with the interpretation of stereo works.

Height to lighting bars: 4.25m
Height to girders: min 4.6m...max 5.2m



Today, the access means (for example the multitouch tablet) and multitrack recording in real-time of a sound or sequence allow greater accuracy of trajectory and positioning in space. Each sound can receive a precise spatial identity in the studio. The space truly becomes a musical parameter equivalent to others, if the composer wants. However, in concert situations, the interpretation is less free and creative than in the case of a stereo work: unless we multiply the total number of speakers by eight - The octophony becomes a standard in electroacoustic music - and that is concentrated on a single fader one group of 8 speakers (cf. BEAST in its second version that Jonty Harrison has completed a piece of 72 channels [*BEASTiary*], is the precursor system), it reduces the possibilities of choice in the play on the projection console and it also decreases the diversity of colors offered by the acousmonium “à la française”; indeed to fulfill the spatial balance of the composition, we must give the same color, so the same loudspeakers in each group. The Musiques & Recherches’ acousmonium Brussels solves these two requirements (diversity of colors and octo groups) with a “à la belge” compromise.

The stylistics

Depending on the character of each piece, one can, for a different work space, focusing on some aspect of writing: iconicity, movement, unmixing of polyphony, and phrasing changes, subjectivity matters, fluidity of the trajectories.

MUS examples :

JM Duchenne, *feuilles d'album*

The Image, the Iconicity: the "phonographic" image is viewed, understood and reframed, enlarged with the right dimensions that offer its content. We do not give the same relief, the same caliber to an outdoor soundscape or to a vocal character's portrait or a sonic representation of an interior.

M. Rodrigue *the voyageur*.

The Movement: the energy, inherent movement in the nature of a sonic sequence or a thread will be all the more apparent that it will be translated by a correlated spatial movement and of the same nature.

:

D. Dufour: *Terra incognita: de imperio*.

The "unmixing" of contrapuntal writing: writing the mixing is "stripped", after its analysis by specific spatial placement of types of sounds. If the writing gives more importance to individual sonic element, one will highlight from a group one or another pair of loudspeakers.

F. Bayle *vibrations composées: petite polyphonie*

The Phrasing and the Variations: the structure of the work, its phrasing, rhythm and variations are made explicit by an internalization of the interpreter who "relive" the work, plays it eyes closed, as if he had composed it himself. This is acousmatic modality applied to interpretation.

P. Henry, *Apocalypse de Jean: mer de verre et harpe de Dieu*

The Subjectivity: often, in : the works with text for example, it comes to making the listener feel which internal situation the character speaks. Kind of subjective camera, it is the balance between different points of space, defined and fixed which the internal space (often reinforced by the tone of voice in the presence of a text) clearly differs.

B. Parmegiani, *Capture éphémère*.

The Matter: the roughness, grain, or flow, density, mass of the materials will be enhanced by the proximity, distance, number and density of loudspeakers.

B. Ferreyra, *la rivière des oiseaux*

The Mobility: Create fluid and unpredictable trajectories by a set of successive crossfades which separates stereo into two mono channels which are placed independently on differentiated number, location and quality of speakers.

The figuralism

A. Vande Gorne:

Yawar Fiesta: combattimento 10'30

The figuralism, by playing with spatial figures, seems a royal way to give meaning and justify the space as an element that enhances the expressiveness of the musical work.

A new profession: the spatialisation interpreter

The concert stereo projection of sonic pictures on screens of phase that are pairs of loudspeakers, is undoubtedly the form of spatial interpretation the most flexible, varied and free. This requires an experienced practice or learning of this new interpreter profession, too often left to the discretion of composers themselves when they have not sufficiently exercised.

It takes the knowledge of the work which may be helped by its graphic transcription and a good experience of the response of each pair of speakers in the acoustic of the place. The act of interpretation begins with the design of the sound system and its placement, the orientation and the role given to each loudspeaker, the ergonomic allocation of these on the potentiometers of the console. The interpreter then becomes familiar with the system and memorise the configuration of the console to acquire alive and safe gestural reflexes.

Then, the rehearsal will take into account the internal space of the work, movements, highlighting speeds will increase, clarifying plans in depth of field. I still assign other functions to the spatialisation in the context of the interpretation itself in : concert, as well as part of the multichannel composition in studio : It is to clarify to the listener the structure of work, its sections, by attributing to each, for example, a different spatial configuration. It then will perform spatial figures within each configuration. It is also to strengthen the perception of memory games by returning to the same spatial configuration or location with the resumed signal sounds or identical sequences in the different times of the composition.

Multichannel works, of which the writing space is already defined, de facto leave less freedom or fluidity on the interpretation in concert. It is then to set in the place the ratios of the tracks on a system of which the number of speakers is greater than the number of tracks, and to play, varying combinations of groups, ensuring that all tracks are always audible: indicate in this design, the track number on the console of projection.

These are just a few aspects of the profession of spatialisation interpreter that responds like any other instrumental discipline, the competence / performance couple: technical knowledge of its instrument, analytical and memorised knowledge of the work, and the desire of forward following the "feeling" of the moment, the emotion experienced during the concert.



Festival L'Espace du Son, Bruxelles, Le Marni 2011. Installation lumineuse : Pierre Gallais

Space for what? : Composed space

As for any musical element, the space of sound is attributed a level of musical function decided by the composer. Nowadays technology allows for any variations in the use of space, from a micro event (static or dynamic spatial location for each sound) to a macro structure (whether the spatial structure, dynamic or static, mono or polyphonic for each section, phrases or group of events)

•Among other possible levels, I have selected the following 6 which, to me, are particularly useful and expressive:

Abstract level of space, conceived of plans, volumes, movements, or geometric figure

Structural level of space, used to emphasise sections, transitions or recall

Decorative level of space, often in movement, added to an event to strengthen its meaning or temporary function

Figurative level, relating space to the imagination, the key feature, the metaphor Archetypal level of some obvious space figures, such as the wave (rocking movement), circle (locked-in effect), explosion...

Madrigal level of the expressive strengthening of elements external to the music itself (text, image,...) : through figures, movements, and appropriate spatial situations.

1. Abstract Level

In stereo, depth plans lighten and clarify the sonic orchestration, the mix. The space becomes an active agent as well as terracing heights registers, and tonal colorations in orchestral writing.

Spatial differentiations allow a form of variations on the same material.

Without going back to fifties and sixties (K. Stockhausen *Gesang der Jünglinge* 1956 *Kontakte* 1960) or 1972 (J. Chowning, *Turenas*), abstract multichannel writing evolves in the decade of 1990 with new 8 digital tracks player-recorders. In 1989, *Lune Noire* of Patrick Ascione, composed and mixed at the GRM on analog 16-track 2-inch tape, installs a dual-space movement swirling around the audience and on stage. The same year, *Terre*, the fifth element of A. Vande Gorne's *TAO* combines geometric figures spaces in and around the public on 8-track analog 1 inch tape.

2. Structural Level

The choice of movement helps clarifying one form or section, a particular moment to highlight.

For example, a double mirror section, of which events and materials are similar, but inverted spatial movement accentuates an inverted form: Ex: *Yawar Fiesta, combattimento extract* « *neath the blows of your croup* » and « *and the milk of your loins* » (15'45)

In another example, a repeated figure as transition, with gradual acceleration in the rotation and transposition to the acute: Ex: *Yawar Fiesta, combattimento, prologue* as transition 1 and 2 (start to 13'21)

3. Ornamental Level

Space or added movement to strengthen the interest of sound figure

As biting or trill, the path directs attention to a perceptual elements among others. This space allows source-type writing "background figure" Ex: *Yawar Fiesta, act I* « *Condor* » movement in circle on the word « *Taureau* » *in order to fight the bull.*

4. Figurative level

The imaginary, which is based on the recognition, recreates the space, movement and location:

Ex iconic level: A.Vande Gorne *Paysage / Vitess* : movement "Voyage" Left-Right is artificially applied to a sound cicada; what do you hear the most: source (listening index), or movement?

Often characteristic enough to cause spatial image: diagrammatic level. Eg A.Vande Gorne *The Gingko: the desert*. What we imagination of the desert?

Finally, the metaphorical level depends on the overall context. Eg A.Vande Gorne *Yawar Fiesta act 1*: voice above the public to mark the destiny of a people : "be like the sky that burns and blazes above our pastures"

5. Archetypal level

Certain movements, by their mere presence qualify the meaning of the message, context, communication.

Ex: the wave (round trip, hesitation, rocker) A.Vande Gorne *Yawar fiesta, final monologue: the gods*

Ex: the circle (confinement) *Yawar fiesta, final monologue: the same tain said*

Ex: The explosion: *TAO Terre, Part I* to express the "big bang" primordial

Ex: Spiral: *TAO Terre, Final* : to the Omega

6. Madrigal level

Polyphonic music abstract architectures have evolved towards the expressiveness thanks to the passage of the text and its immediate naive relationship developed in the 16th century madrigal. I tried this same relationship in : an opera, assigning this role to spatial movements, or spatial illusion.

Ex Yawar Fiesta: acte II *combattimento* : *we dream* : reverb on all channels

Ex Yawar Fiesta: acte II *combattimento* : *the sound of your hoof* (rhythms on the fragmented words) *we have fed our souls on it* (movement far away in front and medium high frequencies on the word "soul")

Ex: Yawar Fiesta: acte III *monologue final: Here at least where words are sung all meet up again for the games* (full space) *of darkness* (empty space rear) *and light* (solo front center)

conclusion

The spatial projection of music for listening Acousmatic (the sound in the space) entitles the space of the future to open up to a fifth dimension of expressive music: the space of sound.

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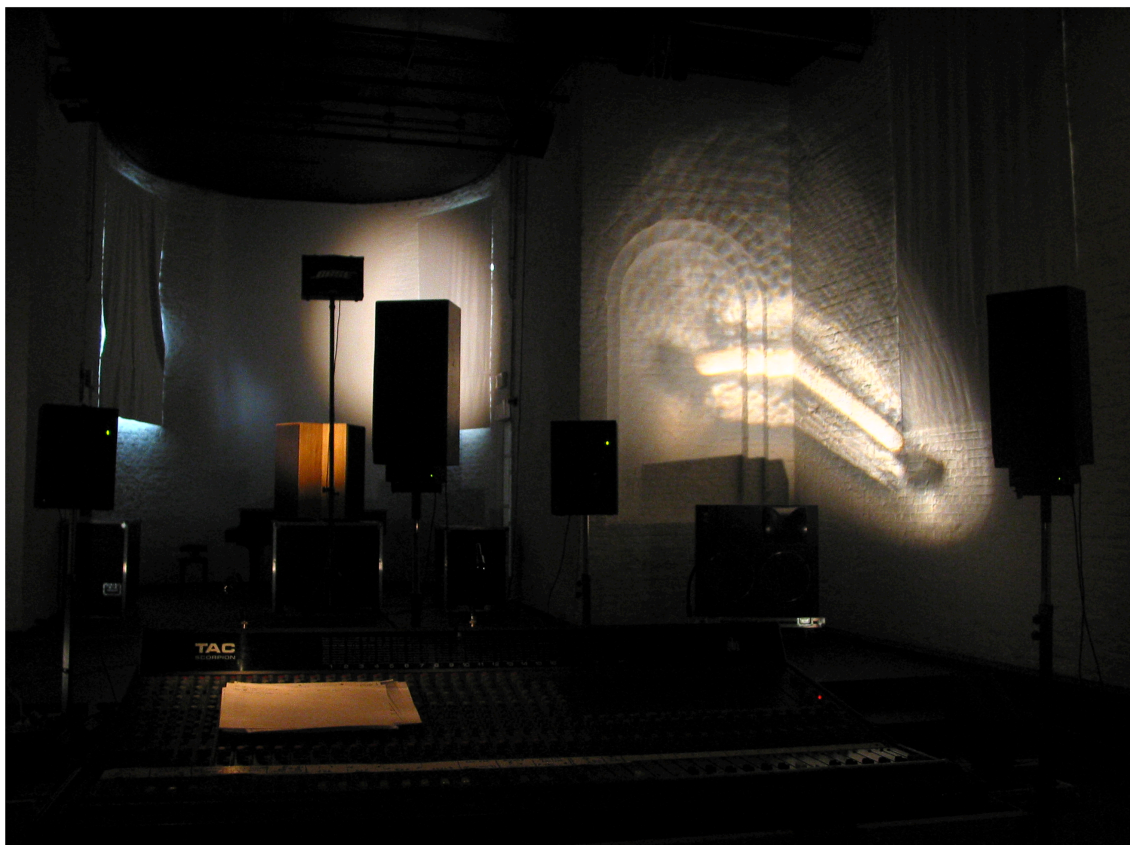
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