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TRANSMEDIATIC ARCHITECTURE OF THE ODE TO CHRISTUS HYPERCUBUS

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"The most potent intellectual impression, despite the particular satisfactions enjoyed, of every journey in recent years is a slight horror in the face of the monopolization of the world. Everything is becoming more uniform in its outward manifestations, everything leveled into a uniform cultural schema. The characteristic habits of individual peoples are being worn away, native dress giving way to uniforms, customs becoming international. Countries seem increasingly to have slipped simultaneously into each other; people's activity and vitality follows a single schema; cities grow increasingly similar in appearance."

Stefan Zweig, "The Monotonization of the World" (1925)

INTRODUCTION

The monograph presents a transmediatic architecture involving music and painting. The composition is inspired by a musical metaphor in which sounds are resonating all over walls and arch of an imaginary Cathedral. Computer-generated animation and sounds, a soprano, a piano player and virtual choir simulate such environment in order to perform the Ode to Salvador Dalí's Christus Hypercubus. The Ode dialogues with the notion of the fourth dimension transferring to the acoustic space a musical projection of the Tesseract or Hypercube. A diffused acoustic field with fragments of sacred music invites the audience to explore meanings of the Catalan's masterpiece.

The Ode is described here in parallel to a photography essay presenting the graphics animation produced during the Ode performance that results in complex visual textures.

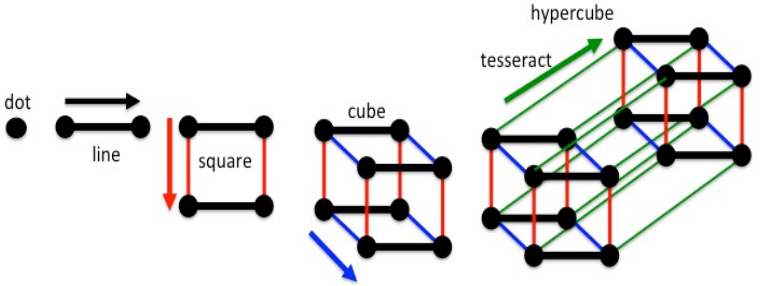
Ode graphic animation (Credit: Nato Manzolli).

FROM TESSARACT TO HOLOGRAM

Hilton's New Era of Thought (1888) described the genesis of the forth dimension in its three dimensional representation, he supposed a geometric translation with 2 cubes to generate the Tessaract:

> *A square is not a longer line, nor a cube a longer square. When the cube moves, we are unable to see any new direction in which it can move, and are compelled to make it move in a direction which has previously been used. Let us suppose there is an unknown direction at right angles to our known directions, just as a third direction would be unknown to a being confined to the surface of the table. And let the cube move in this unknown direction for an inch. We call the figure it traces a Tessaract (Hilton, 1888, p. 199).*

Ode graphic animation (Credit: Nato Manzolli).



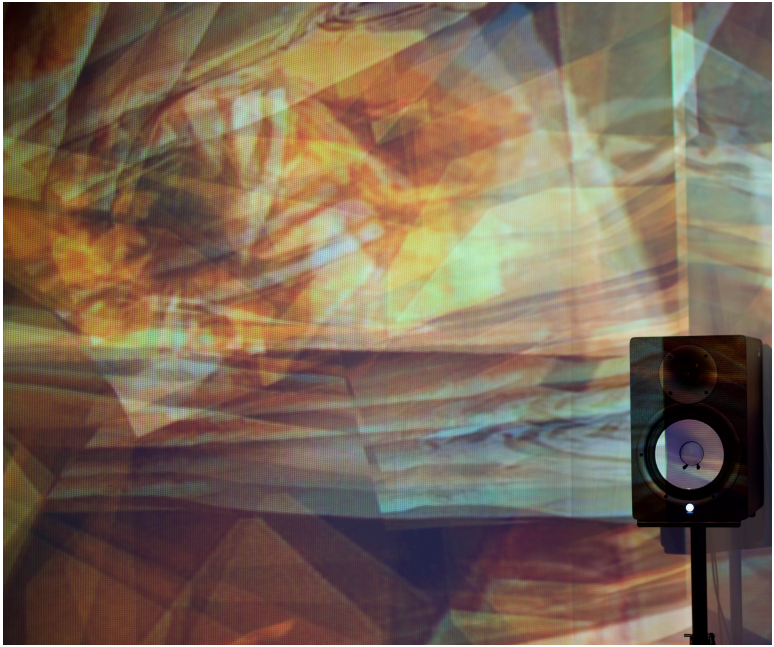
Construction of the Tesseract or Hypercube

In 1936 the fourth dimension seemed something irreversible in Art, the Hungarian poet and Art theorist Charles Tamkó Sirató in his "Dimensionist Manifesto" argued that literature "getting off the line and entering the plane ... the painting leaves the plane and enters the space ... (and) the sculpture leaves closed and still forms" (Sirató, 1936), nevertheless the term hypercube was minted later and this is a preview of the hologram.

Ode graphic animation (Credit: Nato Manzolli).

The importance and relevance of Dalí's Hypercubus is also historical, since it is prior to the vision of space as having one more dimension, previous to quantum physics, besides having substantial contributions to Art, since it breaks with the conceptions of conventional geometric figures and admits an "interaction" with the fourth dimension, anticipatory vision of the hologram.

Further, projections of the hypercube lead to the three-dimensional reconstruction of images, as these must be continually reproduced in order not to fade out. The continuous process implies a fourth dimension, not only the temporal, but the continuous reconstruction of light points in space forms a holographic image together.



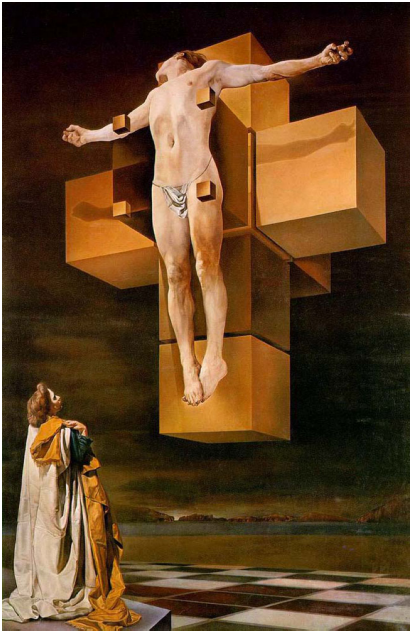
Ode graphic animation (Credit: Nato Manzolli).

MYSTICAL MANIFEESTO

Despite in 1951, Dalí wrote the "Mystical Manifesto", only in 1954 his mystical concept was realized in the Crucifixion: Corpus Hypercubus (Christus Hypercubus) where Jesus Christ appears hovering over the space ahead of a cross in the fourth dimension, there are no nails, with a woman in front of the cross, whose model would be his wife.

In the Manifesto, Dalí expressed also interactions with the Theory of Relativity:

> Ever since the theory of relativity substituted the substratum of the universe for the ether, thus dethroning and reducing time to its relative role, which Heraclitus already assigned it when the said that "time is a child, " and Dalí too when he painted his famous "soft watches". (Dalí, 1951, pg 365).



Crucifixion: Corpus Hypercubus (Christus Hypercubus)

Persistence of Memory, paint with the “soft” watches.

Cubists such as Pablo Picasso had attempted also to paint four-dimensional forms on two-dimensional canvas, the theories of mathematicians Bernhard Riemann and Henri Poincaré were driven by geometric forms such as straight lines and planes were his inspiration. Dalí went further in early descriptions he called his painting "metaphysical and transcendent cubism". Although until his death in 1989, Dalí had explored concepts from Theoretical Physics what might prove years of interaction with the mathematician Thomas Banchoff of Brown University. Despite Banchoff's initial refusal in 1975, there was indeed collaboration for almost a decade.

Recently, Banchoff (2014) described the Dalí's connection with 20th-century theories such us Relativity and the fourth dimension:

[…] while the deformed clocks are often considered statements about space-time, "The Crucifixion", as it was originally called, makes a statement about four-dimensional space and soon it became known by its geometric name." (Banchoff, 2014, pg 2).

Thomas Banchoff and Salvador Dali

MUSICAL DIMENSIONS OF THE ODE

The Ode integrates spatial, visual and sound modalities, the first ones derived from Dalí's painting and the later one derived from a sound-architectural musical metaphor. It evokes reminiscences of a dilated sound in space-time within a diffused field of music fragments. It is sought to take the audience to immerse in resonances that would still persist from walls of Cathedrals. The Ode fulfills the sound space with multi-sources of sacred music alliterations. It orchestrates 16 compositions in miniatures called “stanzas of the Ode”. The poem "Caminho da Espera" (Waiting Way) written by the author provides lyrics for excerpts from three sacred works: "Ave Maris Stella" by Perotin (1200-1225), European composer who is believed to be French, "Benedictus" by Portuguese composer Frei Manuel Cardoso (1566-1650) and "Sepulto Domino" by the Brazilian composer Father José Maurício Nunes Garcia (1767-1830).

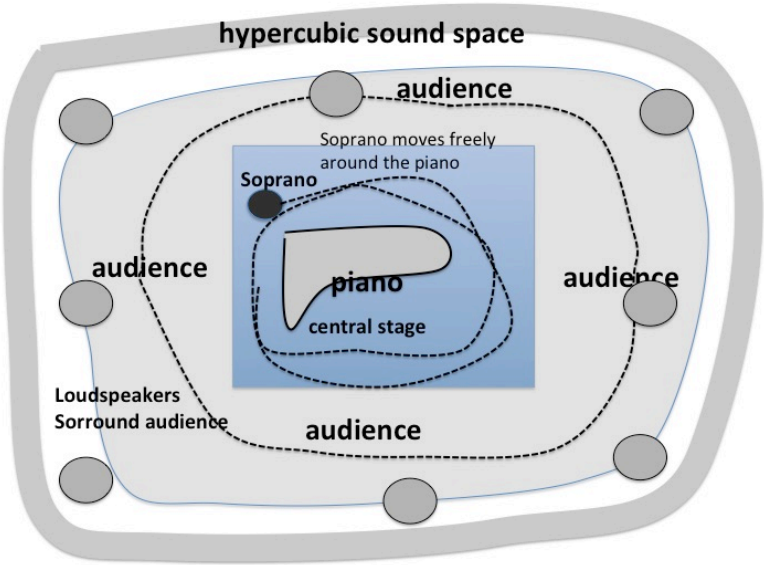
Caminho da Espera

somente o vazio sobre mim da mesma maneira quando percorri distâncias para te encontrar. somente estou lá na saída e já transito da entrada para ela. somente com o espaço sobre mim é que posso cruzá-lo. somente aqui é que nunca estou mas sempre lá.	somente ao longo do caminho deixa-me próximo e distante a tua espera. somente há espaços quando sinto que neles habito. somente agora entendi que sempre estavas lá. somente sei do teu olhar sempre olhas para mim são há como fugir da tua presença.

Path of Waiting

only the emptiness over me the same way as when I travelled distances to meet you. only here by the exit I am and already transit from the entrance to it. only with the space over me can I cross it. only here where I never am but always there.	only along the way leaves me close and distant waiting for you. only there are spaces when I feel that in them you reside. only now do I understand that you always had been there. only do I know from your gaze that always looks at me there is no way to escape from your presence.

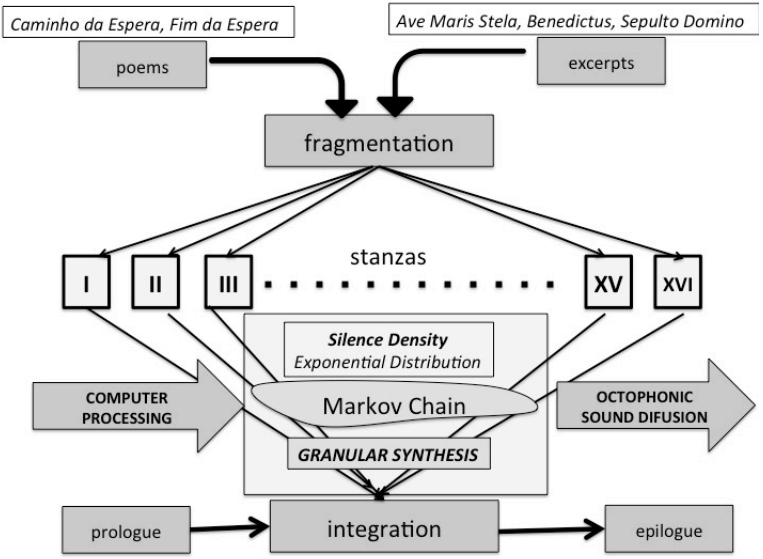
A notion of four-dimensional sound space is built with an electroacoustic diffusion controlled by the computer and mobile devices in real time. A chain of speakers is distributed throughout the installation inviting the listener to immerse into multiple sound layers or sound dimensions. Many sounds played in one performance won't be played in other. Using Bluetooth speakers and/or other with more power that depends on the acoustic capacity desired for the installation or the concert hall, a "hypercubic sound space" is conceived within the quadriphonic or octophonic diffusion.



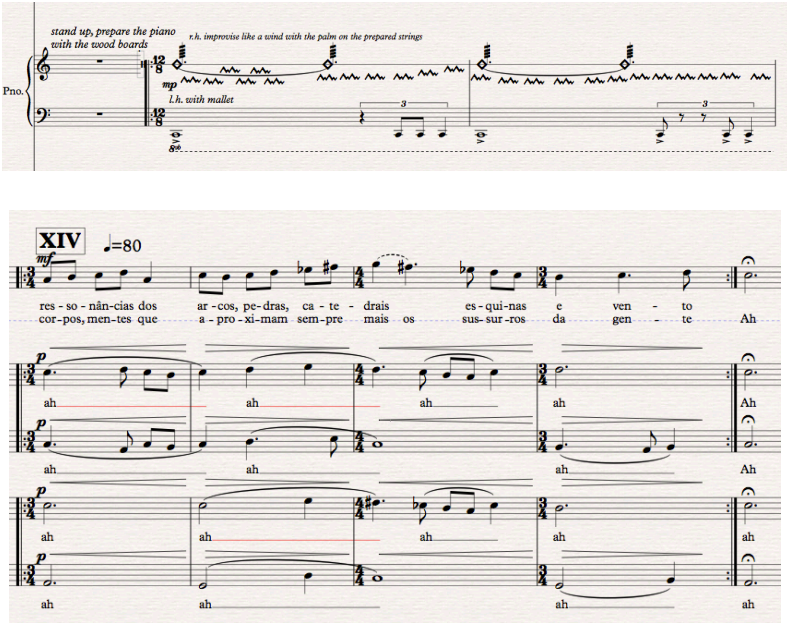
Diffusion sound system of the Ode.

In Dalí's painting, next to Christ suspended in space, there is a woman in front of the cross. The contemplative position is expressed in the Ode by the emergence of silence while performers interact to each other within a movement diagram.

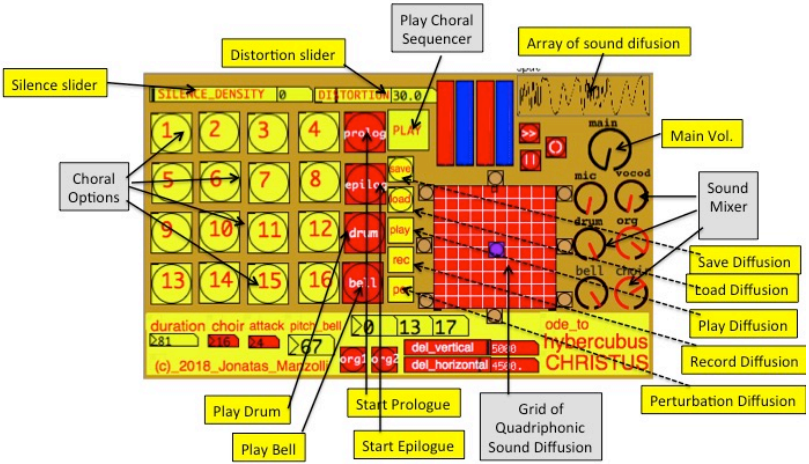
In order to generate a soundscape with chants, resonances and silences a parameter called Silence Density is applied. Merge of fragmented sounds, resonances and silences result on dynamic music textures. Finally, concatenation of sound layers is controlled by Markov Chain result in a continuum of sounds.



General Architecture of the Ode.



Excerpts of the piano (top) and voice parts of the Ode (bottom).



Diffusion: sonic path in a quadriphonic diffusion systems

GUI of the Main program implemented in Pure Data.

GRAPHICS AND HOLOGRAPHIC DIMENSION

Using the Pure Data GEM library, an interactive real-time animation using cropped fragments of Dali's Christus was developed. Applying of tridimensional translation and rotation simultaneously generated the real-time graphics. Therefore 3D transformations produce complex textures that are obtained by the iterative superimposition and dilatation of cubes displayed in the graphics interface. The series of images showed in the monograph were shot using low speed exposition in other to capture the

The idea is to simulate fourth-dimensional hypercubus using parameters extracted from the audio signal generated by the electroacoustic Organum, the mezzo voice, and the piano. The program extracts pitch and intensity from the signal captured internally or through microphones and iterative transforms the four cubes in real-time. Every time the computer detects a new note, a new image, from a set

of the seven-cropped fragments, is assigned as the texture of each cube. The audience's interaction with the images creates a holographic dimension for the Ode. The Ode has in the visual interaction with the public a complement to its conception of multimodal performance.

Visual Interaction during the Ode performance (Credit: Nato Manzolli).

Ode graphic animation (Credit: Nato Manzolli).

Ode graphic animation (Credit: Nato Manzolli).

DISCUSSION

Art today when quantum physics changed the conception of time, networks create interaction among many viewers, is transdisciplinary. The nowadays admits art, culture, and even religion as a culture of relationship. In line with this concept, the Ode might synthesize the essence of that idea, as described by Xenakis:

> Art, and above all, music has a fundamental function, which is to catalyze the sublimation that it can bring about through all means of expression. It must aim through fixations which are landmarks to draw towards a total exaltation in which the individual mingles, losing his consciousness in a truth immediate, rare, enormous, and perfect. If a work of art succeeds in this undertaking even for a single moment, it attains its goal. This tremendous truth is not made of objects, emotions, or sensations; it is beyond these, as Beethoven's Seventh Symphony is

> beyond music. This is why Art can lead to realms that religion still occupies for some people (Xenakis, 1991, pg 1).

Dalí's artwork is not only completely embedded in the culture of our time, but it is also a struggle against the culture of smoothness and the salvation of beauty, as the Korean-German writer Byung-Chul Han criticized the culture of flatness and plane, quoting Jeff Koons' Balloons as an example: "The art of Jeff Koons officiates a sacralization of the polished and flatness. It enacts a religion of the polite, the banal, and moreover, a religion of consumption, and its price is that all negativity must be eliminated." (Han 2018, p.16). Chul Han's viewpoint is derived from the Gadamer's historical consciousness approach: "In Gadamer's view, negativity is essential to Art. It's your wound. He opposes the positive and polished [...] "changes life" (Han 2018,

p.16). Dalí grasped that viewpoint in his Mystical Manifesto when described his Christus:

> Mysticism is the paroxysm of joy in the ultra-individualist affirmation of all man's heterogeneous tendencies within the absolute unity of ecstasy. I want next Christ to be a painting containing more beauty and joy than anything will have been painted up to the present. I want to paint a Christ that will be the absolute contrary in every respect to the materialist and savagely antimystical Christ of Grünewal! (Dalí, 1951, pg 365-366)

ODE TO CHRISTUS HYPERCUBUS: A MANIFEST OF SILENCE

All we know is 4.6% of the Universe that is called Baryonic matter, 71.4% is the dark energy from which we have the first pieces of evidence and the speculations and 24% is dark matter of which we know very little, quite nothing. That

is, the Universe is still a great mystery for man. If its basic composition is electromagnetic waves, it is not an exaggerator, not even a poetic exercise, to say that the Universe vibrates as music. And the great part of this song is expressed to our quantized ear (audible sounds are determined at the maximum frequencies of 20 kHz and minimums of 30-40 Hz), as silence such as the expectation in Dali's masterpiece.

In recent studies, the nature of the dark matter of the Universe was revealed and can only be perceived or measured from the gravitational waves. Given dark matter interacts gravitationally, its presence is inferred from effects on visible matters of stars, galaxies, and clusters of galaxies. Thus, there are gravitational paths among the galaxies. In its apparent sparsity, dark matter is a way to understand the history of the Universe (Harvey et. al. 2015). In the same way, wouldn't silence be the dark matter of music? Wouldn't

the gravitational effect of silence be capable to orchestrate paths of sounds? In the hiatus and in the thin and sparse layer produced by silences, there are expansions for rhythms, chords, instrumental groupings and sound textures. And thus, paths of musical development are unveiled.

In line with that concept, the Ode to Christus Hypercubus integrates resonances and silence to reflect how new knowledge is created through Art and Science dialogue. Painting and music were aligned just as the perception of space, sound, and movement arises from grasping gestural information.

Art plays an essential component in the construction of new worldviews whereas Science is by necessity bound by the state of the art and the opinion of peers, Art can boldly leap beyond the shackles of collective expectations and norms

elaborating and validating new principles. Further, dialogue between Art and Science induces changes of knowledge that were imaginable without the interaction between them. The artist could imagine relations between metaphysics, philosophy, scientific theories, and many others, and from them lay down strategies for creating a masterpiece. These unique interactions lead to profound bonds with the human spirit.

The Ode speaks out that the Universe is sustained by conciliating a chain of eddies built within dust of stars.

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Jônatas Manzolli combines contemporary musical creation and cognitive sciences focusing on the dialogues between music and science. The interdisciplinary study results in electroacoustic, instrumental, and multimodal works. A composer and mathematician, full professor of the Institute of Arts, University of Campinas, Brazil, he is a pioneer in the Brazilian research in computer music. He has been a guest researcher at the Institute for Neuroinformatics, Switzerland, and the SPECS Group (SPECS) at the Universitat Pompeu Fabra, Barcelona. He is also a collaborator of the CIRMMT, McGill University, Montreal. Jônatas Manzolli's most notorious achievements have emphasized the delicate relationship between man and machine, including the use of artificial intelligence as digital interfaces such as Ada: Intelligent Space (2002) and the Multimodal Brain Orchestra (2009). His compositions also include large orchestral settings such as the multimodal opera Descobertas (2016). He has received numerous grants and awards including the recent Rockefeller Foundation "Arts & Literary Arts" Award to be an artist resident at the Bellagio Centre, Italy in April 2018.

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His research topics are Semantic Web, Ontologies, Social Networks, and Artificial Intelligence. He has worked on Open Source projects, Open Science and currently works two doctorates in Open Science and a Ph.D. in Open Citations.

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