ONTA

Composer / Researcher:

Dimitri Voudouris

[*1961]

Composition:

Voice

Alecia Van Huysteen

and

Electronics

Duration:

28 min 10 sec

Composed:

2003-2005

PART B

Interdependency

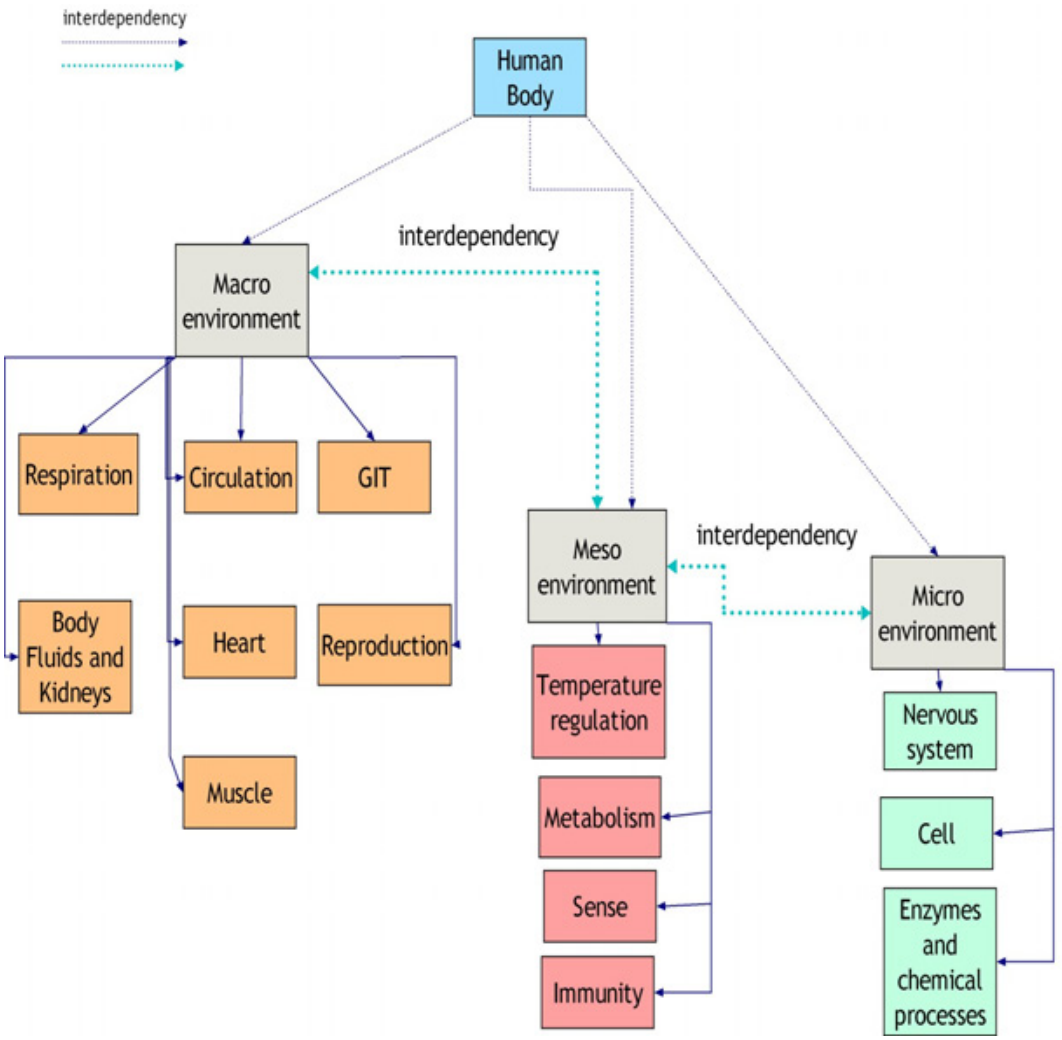


Diagram 19

Diagram 19 The way that each part of the body is compartmentalised into the different environments this diagram shows the interdependency of each part in the human body and also Man's extentions into all environments outside its parameters.

Response to stimulus

If stimulus dimension concentration is in the audible range in the composition, arriving at the auditory level the prevailing environment of an organism may be considered to be the pattern or configuration of all energies, present at any given time, that are capable of entering into lawful relationships with behaviour, influences were attained by the use of visual, auditory, smell, taste and touch senses. These energies are confined, at most, to those that can be detected by the specialized anatomical structures, receptors, that organisms have for receiving certain energies and for transforming them into electrical nerve impulses. The eye is specialized for the reception of a limited range of electromagnetic radiation, the ear for a limited air pressure vibrations,the tongue and nose for certain chemical energies. Receptors in the skin detect mechanical pressure and thermal changes. There are receptors within the muscles and joints of the body that detect the movement of the muscle and joints in which they are embedded. A stimulus is a part of the environment and can be described in terms of its physical dimensions. Man can respond to differences in amplitude or intensity of light waves. Sound stimuli may also be analysed into a set of constituent dimensions.
With response to the stimulus range we will concentrate on sound and try to recreate an environment which indirectly would stimulate the other senses. To attain certain goals in the dynamics of ONTA it was necessary to engage in alternating the amplitude of sound waves which produced changes in the intensity of the energy, and are associated with different loudness responses. These dynamics directly represent the intensities relating to exploding and imploding energy combustion relating e.g. to buildings that are new to those that are old to pedestrians wanting to cross a traffic intersection and to motor vehicles wanting to do the same, money needed by a community for education which they do not get. Such sounds represent very complex admixtures of many different frequencies. What makes ONTA unique is its living coherence of the amalgamation of both organic and inorganic environments into one which addresses the existence of energies that make up tensions in the chemical, mechanical and thermal portions of these environments and thus can be noted to have cellular properties in their construction.
As part of his gestural extensions Man in relationship to the city constructs frozen/lifeless structures its only due his presence that the city takes on life and becomes a place were he can conduct his business, dwell, entertain and develop. The relationships between such association with Man and the environment are two fold what Man senses and absorbs he needs to give back to the environment so that he can manipulate the results to give meaning and fulfil his materialistic needs.

Composing ONTA

The type of composing needed to be consistent with how people already perceive and experience the environment of the city. With this in mind, I developed hypothetical scenarios of user experiences, values, and taste. The scenarios were based on potential users that I knew or interviewed. They were deliberately extreme in order to represent a wide range of possibilities and design implications. Besides helping to determine the amount and nature of user control supported by the system, they revealed differing personal relationships with the city. Specifically, I considered peripheral versus foreground aspects of the experience and musical possibilities ranging from serial to rhythmical. Based on the source that its Man's anatomical nature that creates rhythmical possibilities due to motion versus his gestural extensions creating the lifeless constructions, I defined the boundaries of the composition's space. I was interested in maintaining a close experiential relationship between the sound content and the context of music creation. Thus, using electronic music composition with voice addresses the urban sounds as a basis for sound and voice synthesis. Interesting processing parameters emerging from the composition process were abstracted according to the kind of musical impact they would have on the output.

They were classified into:

- *Structural composition variables,* relative to the number of sound layers and the temporal structure of the music.
  - *Spectral variables,* which determine the quality of each sound (their timbre, envelope, etc.)

The collection of various sampled statistical field data relating to the construction of city resulted in the plotting of graphs of the microscopic, mesoscopic and macroscopic simulation models:

Microscopic simulation model

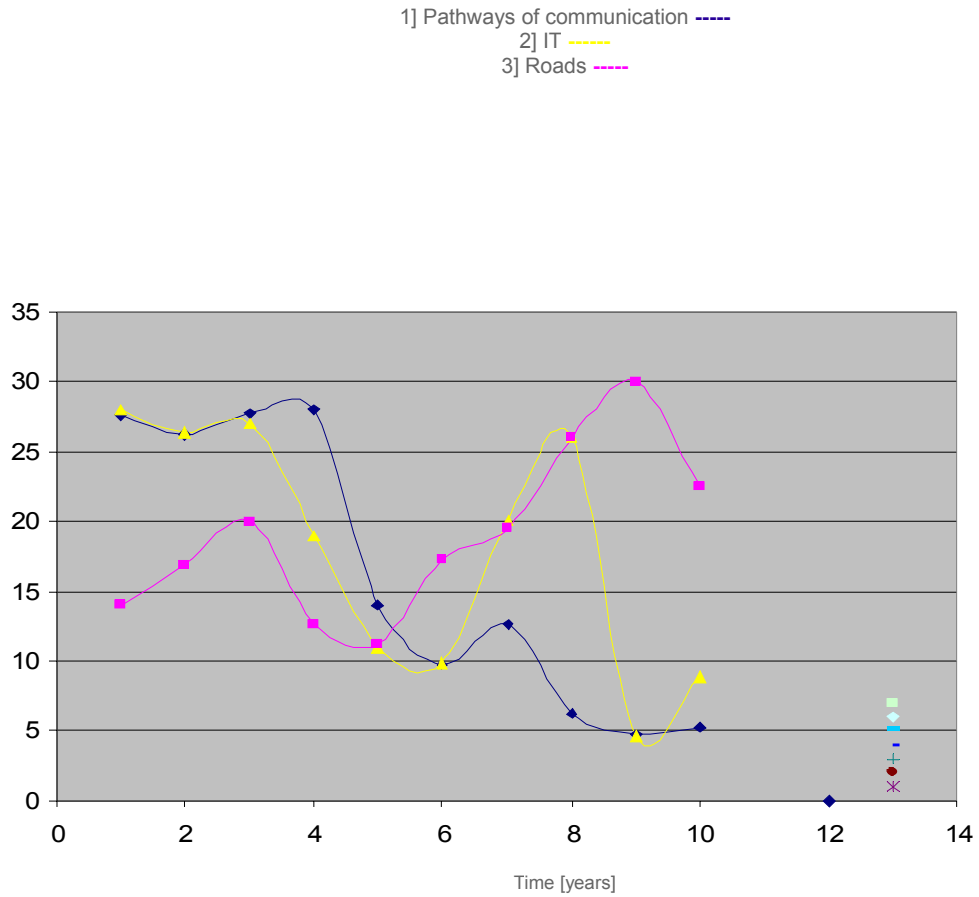


Diagram 20

The above sampled data population was plotted in a frequency polygon over time duration - over 10 year period.

Mesoscopic simulation model

1] Police ---
2] Air conditioning ---
3] Chemical Process in industry and manufacturing ---
4] CCTV ---
5] Television ---
6] Telecommunication ----
7] Computer sensors ---
8] Email ---
9] Army ---
10] Security ----

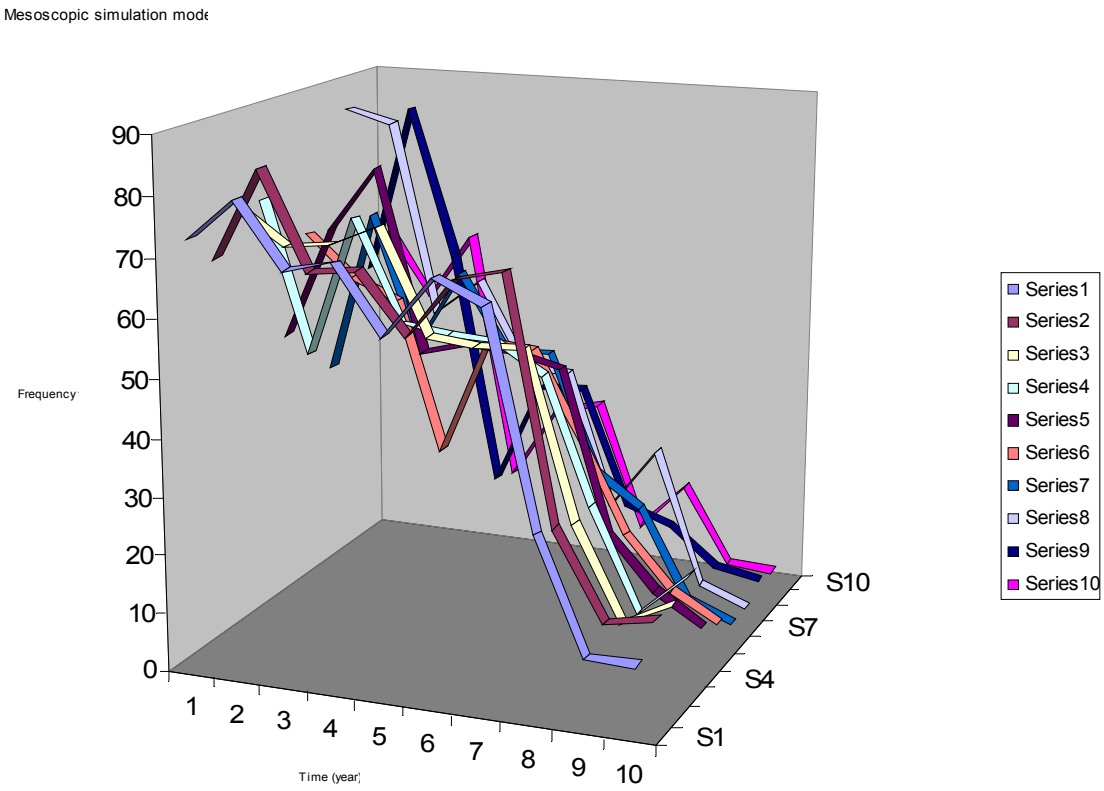


Diagram 21

Macroscopic simulation model

1] Banks Policy ---
2] Transport ----
3] Green House gases emitted ----
4] Demolition ----
5] Healthy economic environment ----
6] Waste disposal and management ----
7] Monetary expenditure ----
8] Restoration of Buildings ----
9] New buildings built ----
10] Government Policy ----

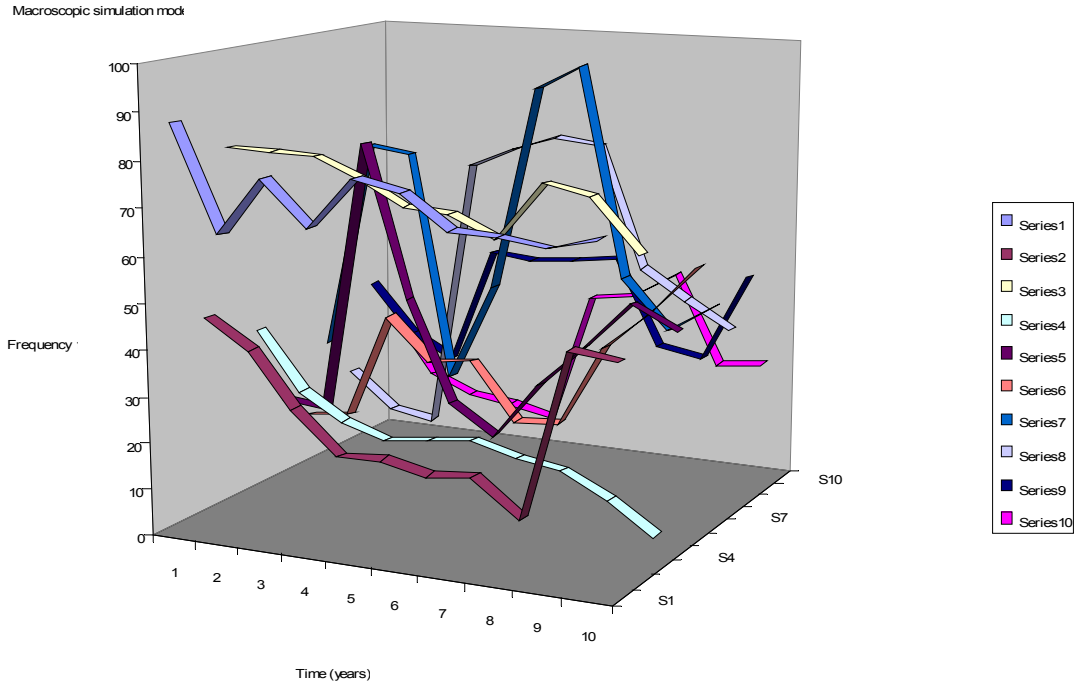


Diagram 22

The data collected could be categorized periodically into seconds, minutes, hours, days, weeks, months and years. The data in the various categories shows cellular properties in linear progression. In this particular instance the annual data was collected and plotted showing results occurring over a ten year period.
In analysing the graphs for potential similarities I highlighted the areas on the graphs that showed exploding and imploding energies. This resulted in producing further mathematical equations to begin construction of the analysis made. The projection of sound allowed for an abundant degree of energy expenditure from all sides, thus this energy as has been dissipated can result in exploding or imploding instances. Furthermore I did not want sight specific results to occur like in UVIVI as I was working on a universal city model, I decided to use the results obtained from the data collection in the experiment make the necessary observations needed in plotting the graphs to obtain a realistic example of intensity, pitch, density and motion curves, I then compared my results with other such observations made from eight researchers from all over the world and calculated an average representation of the data on hand, adjusting the graphs accordingly, I proceeded to make further calculations in Matlab to convert to intensity, duration, speed, pitch curves into sound parameters within the parameter range of frequencies, furthermore the sine waves chosen represented the data analysed, it was also necessary to manipulate Alecia's voice to suite the parameters of frequency.

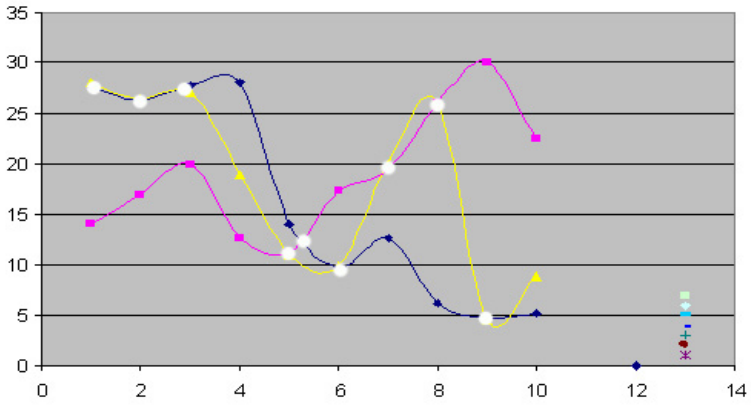


Diagram 23

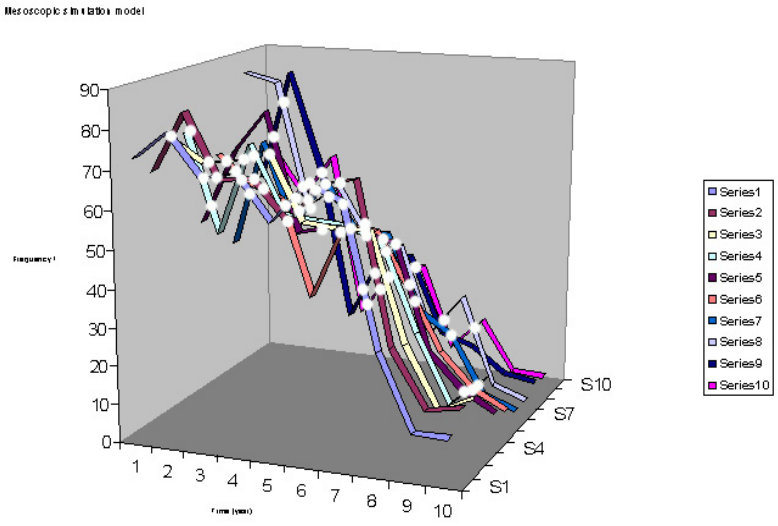


Diagram 24

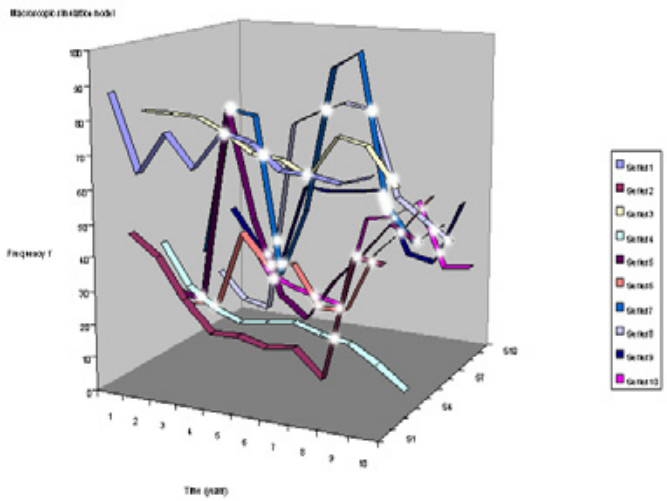


Diagram 25

Diagram 23,24,25 shows areas of exploding and imploding sound obstructions which produce accumulative energies that can act as gateways for different sound possibilities to occur or that the sound becomes dissipated matter as it goes through the transformation of explosion or implosion. These areas can have obstructions that imploding or exploding depending on the similarity of decisions taken or the extent that decisions differ. Lets speculate and say that energies above frequency point 50 are explosive and below are implosive. Such points are said to contain cross sections which can potentiate an electronic sound signal to a point which it becomes inaudible as in very high pitch or the reverse would happen with imploding structures were the sound signal would also become inaudible in a very low pitch.

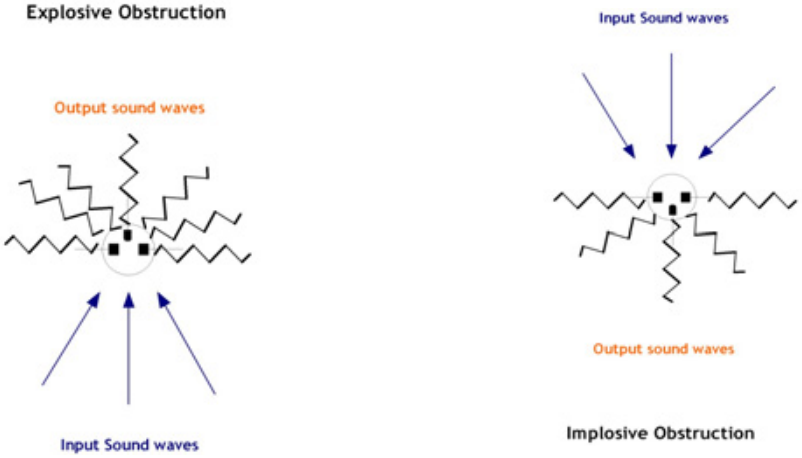


Diagram 26

Diagram 26 shows what happens if an explosive or implosive obstruction is in the pathway of a sound wave approaching its energy gets accumulated and causes the output sound wave to explode in various directions of higher frequency [like charges in an energy field attract each other] and thus the sound projection is said to have an (+) additive value. The sound direction is noticed in 2D above. The opposite happens to an accumulating process causing the output sound wave to implode in various directions of lower frequency [unlike charges in an energy field repel each other] thus the sound projection is said to have a (-) negative value. The sound direction is noticed in 2D above.

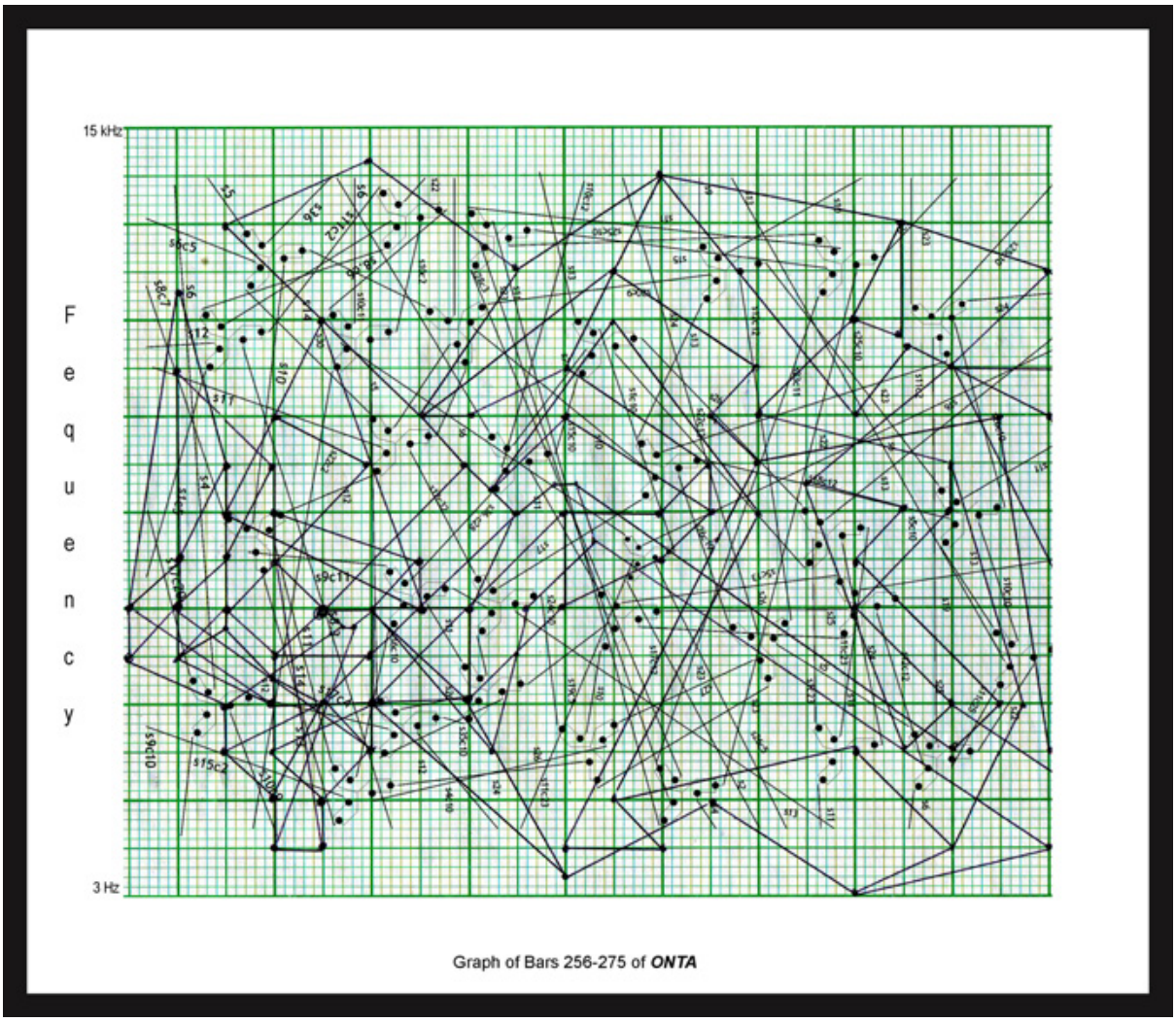


Diagram 27

When there is a reason to suspect the presence of small occurrences acting additively and independently [a conglomeration of points the population of which is said to have similar ideas], thus being continuous [or more precisely have a continuous version] as in **Diagram 27** which shows a continuous flow of events that can have multiplicative modifications. If there is a single external influence which can result into larger flow properties on the variable under consideration, the flow can be greater but when reaching the obstruction point energy flow can be combusted in an implosive or explosive nature thus the assumption of normality is not justified, and is the logarithm of the variable of interest that is normally distributed.
The various positions indicated by the dots in **Diagram 27** can act as resistance points were at a specific instance the decision taken could have a negative or a positive impact on various parts of the population thus affecting the sound proportionally.
The sound that was sourced from the data collected and plotted on graphs in the micro,meso and macroscopic simulation models with these observations, a block diagram of the composition was formulated in **Diagram 29**.
Energy and momentum stored in a sine wave are proportional to the square of its amplitude. If we observe a sine wave passing a given point the displacement at that point varies with time as a sine or cosine. Hence, each point in a sine wave is undergoing simple harmonic motion the kinetic energy and the total energy are also proportional to the amplituted squared. Thus in sound the intensity ***I*** of a wave is directly proportional to its amplituted squared

$$I \propto A^2$$

Periodic waves are characterized by their frequency ***f*** wavelength ***λ*** and velocity ***c***, which are related by ***fλ=c.***.The velocity depends on the properties of the medium and in some cases on the frequency. The amplitude of a wave is the

maximum magnitude of its displacement. Waves can interfere with one another. When two waves are present at a point, the resulting wave is found by algebraically adding the displacements of the individual waves. Two waves in phase add constructively,while two waves a half wavelength out of phase interfere destructively. The property of combining waves by the addition of displacements is called the principle of superposition or linearity.

Kinetic energy:

$$K=\frac{1}{2}mv^2$$

K is the kinetic energy at mass ***m*** and velocity ***v***

Tension:

$$T=m(g+a_y)$$

T is the tension measured at a weight ***mg*** and mass of an object ***m*** at an acceleration ***a***

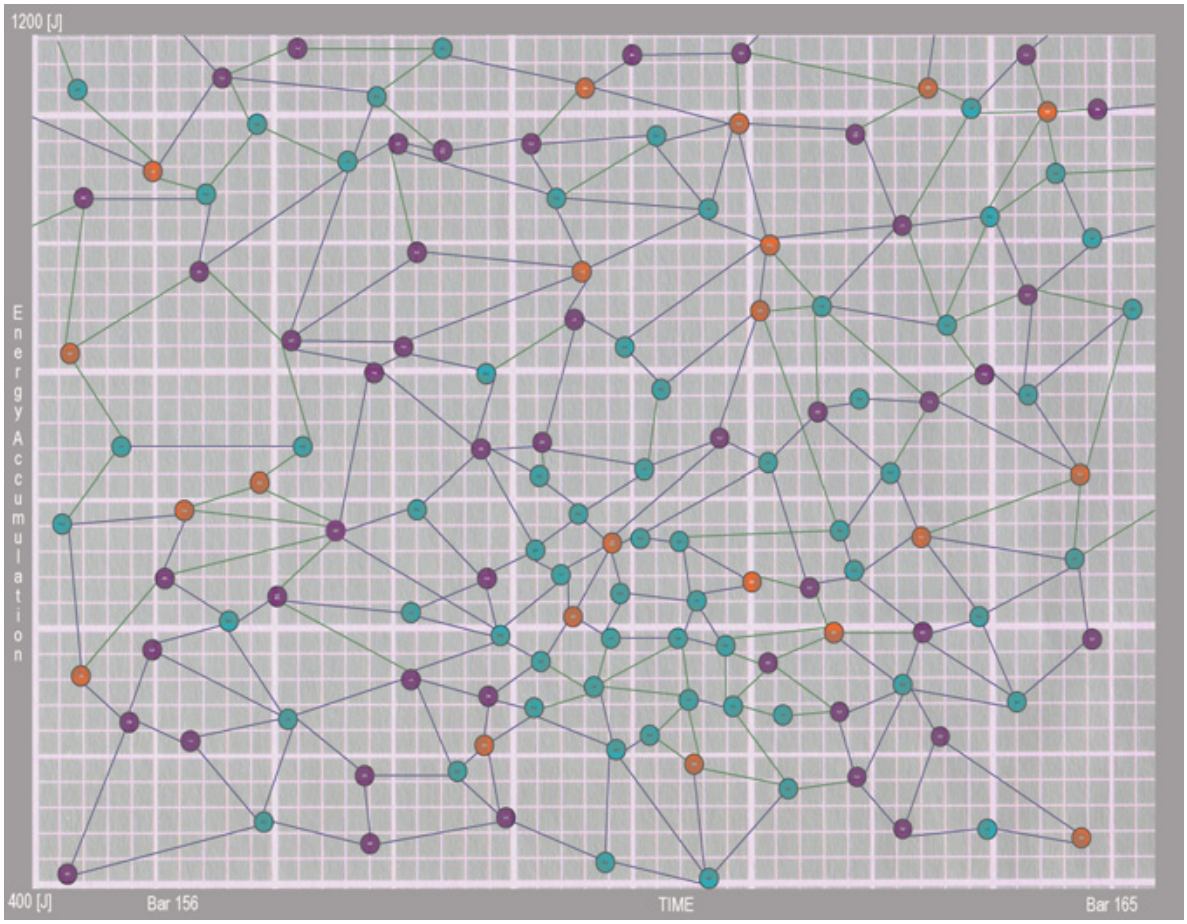


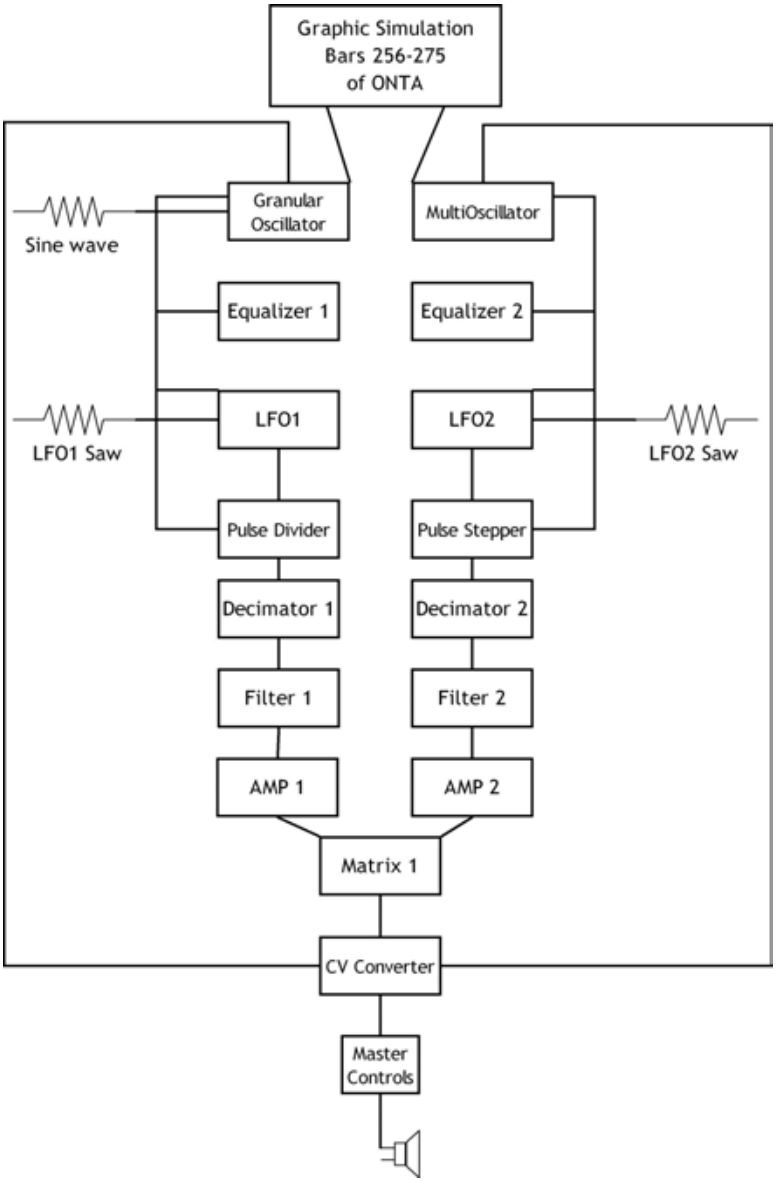
Diagram 28

Microscopic ---- ***Implosion*** ---- ***Microscopic simulation model*** *from Diagram 20*

Mesoscopic ---- ***Explosion*** ---- ***Mesoscopic simulation model*** *from Diagram 21*

Macroscopic ---- ***Macroscopic simulation model*** *from Diagram 22*

Diagram 28 shows one cellular component of the different environments each environmental instance is numbered in accordance to the ever-changing periodic moments calculated in each environment, resulting in the exponential implosive and explosive nature that has to do with the tracing of the [sound] signal through gateways that can result into different sound possibilities and the influential relationship that this signal offers to the surrounding population. e.g. the sound released in Microscopic instance 1 triggers a positive explosive accumulation of energy when reaching Mesoscopic instance 1 that triggers a positive explosive accumulation of energy when reaching Microscopic instance 2 that triggers a positive explosive accumulation of energy when reaching Mesoscopic instance 8 that triggers a negative implosive accumulation of energy when reaching Macroscopic instance 8 or visa versa etc. This current scene of events could change from one moment to another. The event changes occur from the need to produce, the usage to the implementation need e.g. The Mesoscopic instance 1 triggers an implosive accumulation of energy when reaching Microscopic instance 2 or visa versa this occurrence happens due to a 30% drop in IT usage by the Police this could be as a result of problems with usage or that the Police needs special training with the software.



Block diagram of computer score showing graphic transcription between bars 256-275 of ONTA

Diagram 29

Diagram 30

Showing composition strategy

Organic	Inorganic	Statistics	Data / graph	Formulae derivation
Micro environment		**Microscopic simulation model**		
Cell	Building material of a city	Collection and analysis of data relating to	Sampled data and	Parameters of sound duration,intervals of intensity and pitch,speeds,frequency
Nervous system	IT,Roads,Pathways of communication	amount of new buildings build, roads, pathways	graph analysis of field studies	were established ,the simplest of laws were used each of the equations were used in Micro,Meso,Macro environments.
Enzymes	Building blocks of the city	of communication over a ten year period.	showing micro moments of	
and chemical processes			exploding or imploding	Duration:
			areas	$P_x = \delta e^{-\delta x} dx$
Meso environment		**Mesoscopic simulation model**		Poisson's law :
				$P_r = \lambda^X e^{-\lambda} / X!$
Sense	CCTV computer sensors Telecommunication TV Email	Collection and analysis of data relating to the	Sampled data and	
Immunity	Police Army Security	amount of security services,email,CCTV,computer	graph analysis of field studies	
Temperature regulation	Air conditioning	sensors, industry,manufacturing expansion,	showing micro moments of	
Metabolism	Chemical process in industry and manufacturing	due to an increase in population ten year data	exploding or imploding areas	Intervals of intensity, pitch:
		collectively obtained from industry and		$\theta_{(\gamma)} d_\gamma = \frac{2}{\alpha}(1 - \frac{\gamma}{\alpha}) d_\gamma$
		manufacturing sectors.		
Macro environment		**Macroscopic simulation model**		
Respiration	Green house gases emitted	Collection and analysis of data relating to Waste	Sampled data and	
Circulation	Transport	management,transport,Building and demolition	graph analysis of field studies	Speeds:
Heart	Banks and government policy	restoration and new buildings built,green house gas	showing micro moments of	$f(v) = \frac{2}{\alpha\sqrt{\pi}} e^{-v^2/\alpha^2}$
Muscle	Building and Demolition	emissions over ten years obtained through	exploding or imploding areas	Frequency :
Body Fluids and Kidney	Healthy economic environment/ Waste disposal	government industry and manufacturing sectors.		16Hz-12kHz
Gastro-intestinal tract	Monetary expenditure/Waste management			
Reproduction	Restoration and new buildings built			

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