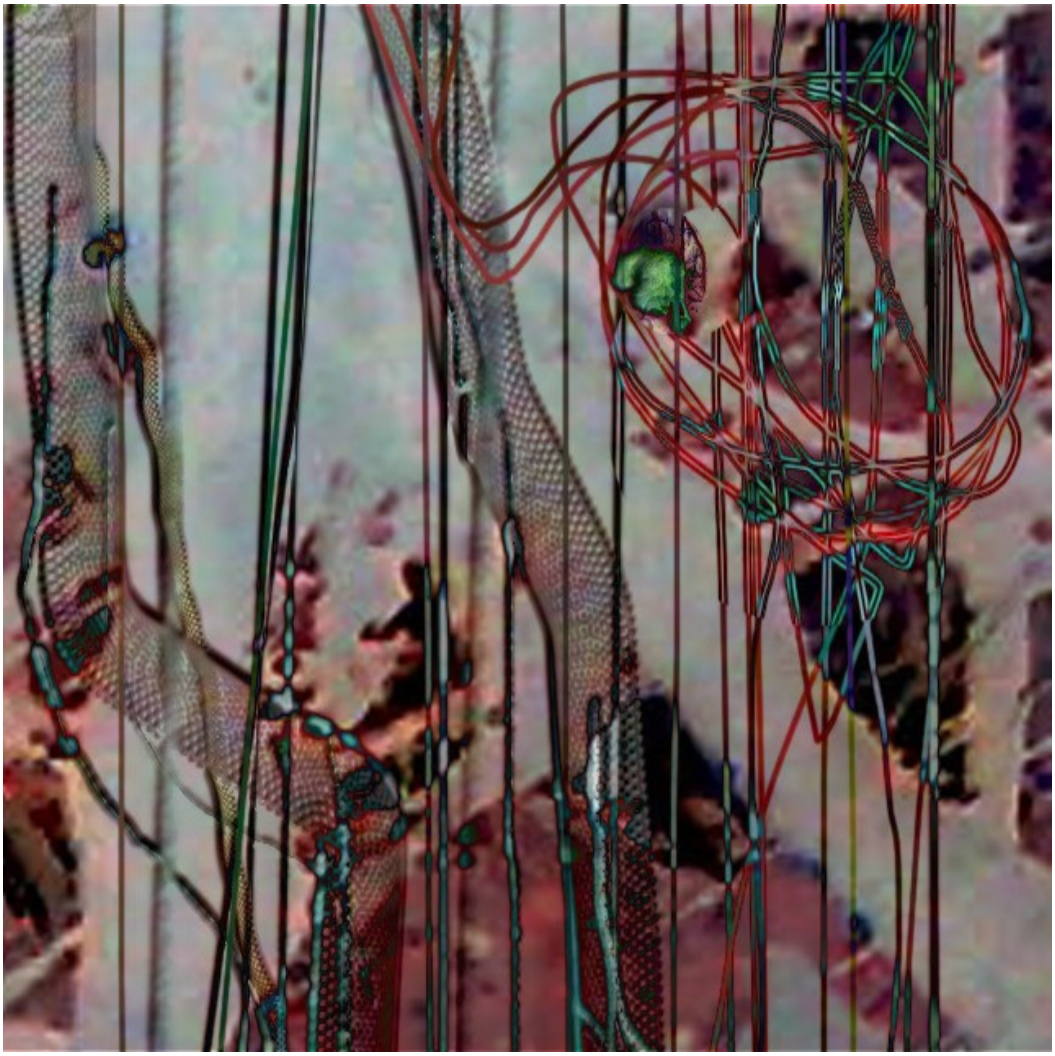


Artificial evolution 29 (hin7459)
© Dimitri Voudouris 1992

Composer / Researcher

Dimitri Voudouris

Composition

A [EV]: 3070/7f

Composed

[2013 - 2014]

Duration

10 min 50 sec

Artificial speech and singing synthesis,
computer assisted electronics,
[composition assisted by Matlab's
computational autonomy]

Matlab in artificial symbiosis:

Matlab is used as an assistant composer in A [EV]: 3070/7f computer music composition to solve mathematical problems. Partially developed sound fragments are presented to *Matlab* in bundles with a linear time restriction of 60 seconds. Emphasis, however, has been given to the ability of *Matlab* to perform computational tasks with minimum human intervention (computational autonomy) resulting in processing, positioning, adjusting, rearranging, selecting and precise splitting of sound fragment/s in a variety of ways. Constructing “colonial” sound “fragments” in which each fragment and its subordinate sound fragments form units similar to "clade/s”. The process of fragmentation and the possible structuring into group formations plays an important role in the mechanism of selection and strategic structuring of the environments.

Selection a process of symbiotic mimicking by Matlab:

[a] If sound fragment/s benefit or obligate from the coexistence [benefits in density, duration, pitch, intensity and velocity from the surrounding environment] while the other sound fragment/s coexist. They would primarily be selected in *Matlab* and processed and grouped, in group ***one*** of selections.
b] If coexistence is beneficial for more than two symbionts. They would primarily be selected in *Matlab* and processed and grouped in group ***two*** of selections.
c] If the original sound source (host) suffers from the coexistence but the other sound fragment/s neither benefits nor coexist. They would be rejected.

Matlab three steps in computation process:

1] Processing is done in areas of density, duration, pitch, intensity and velocity.
2] Splitting of sound fragments.
3] Selecting , assembling, placing and positioning the sound fragments into the final composition module.

Composition:

Artificial audio symbiosis: Is a construction, an interaction between different sound fragments existing in close physical association, typically to their advantage. In the construction of **A [EV]: 3070/7f** – *Artificial evolution is a process by which Matlab developed 60 sec sound fragments consisting of 176 sound compartments with a total 3070 sound files*. The environments constructed were placed together in the form of a puzzle. Each "biotic" compartment had morphological differences in various orders of positioning, density, duration, pitch, intensity and velocity. The computer was programmed *[through Matlab]* to statistically work out these variations with possible suggestions. Most sound compartments have environments within environments suggesting that within a complex system there are various possibilities that can change the outcome of the composition in a multiple ways. This process of adaptive artificial intelligence which leads us to an evolutionary splitting event in the construction of a sound "fragments" and the development of a greater variety of subordinates. This procedure resulted in 29 compositional modules or sound evolutions. A[EV]: 3070/7f is the evolution selected for this project, consisting of 55-60% contribution by the composer and the rest by the assistant composer.

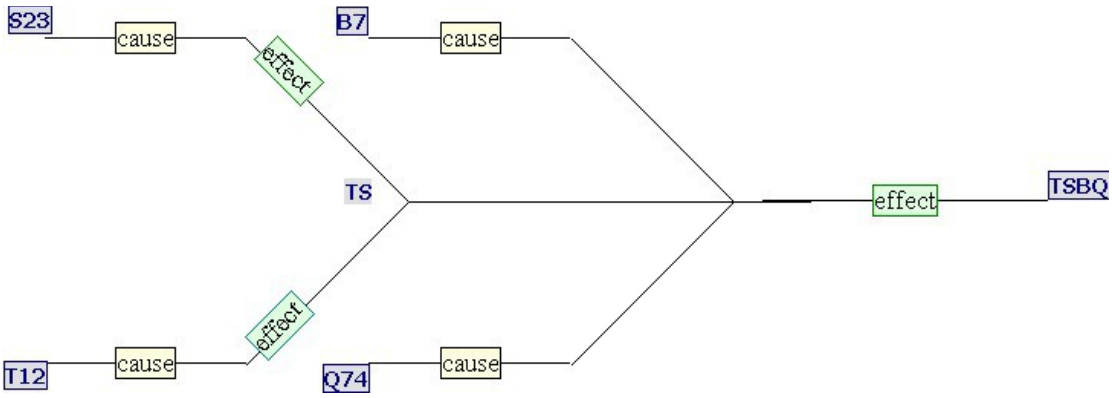


fig 1

[Artificial sound] evolution – Formation of clades TS and TSBQ, with S23 [sound fragment/s] combined with T12 [sound fragment/s] having particular velocity, pitch, density, duration, intensity form a new audio segment TS [clade]. Further combining TS with B7 and Q74 results in an evolution of artificial new outcome of sound [clade] TSBQ.

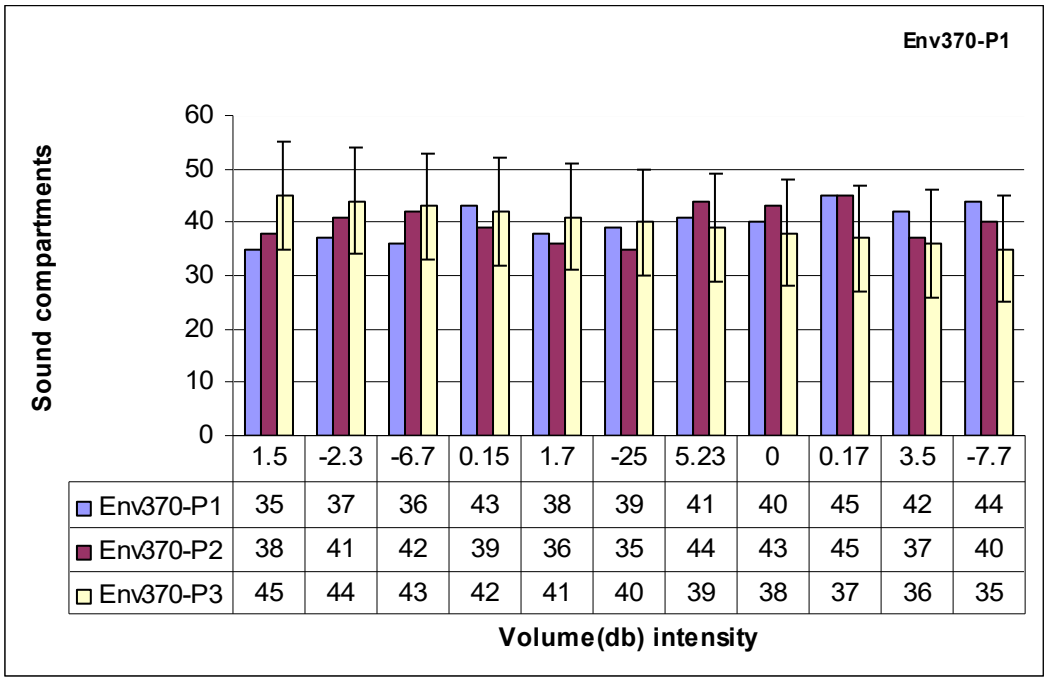

Env370-P1
Sound compartments
60
50
40
30
20
10
0
1.5 -2.3 -6.7 0.15 1.7 -25 5.23 0 0.17 3.5 -7.7
Env370-P1 35 37 36 43 38 39 41 40 45 42 44
Env370-P2 38 41 42 39 36 35 44 43 45 37 40
Env370-P3 45 44 43 42 41 40 39 38 37 36 35
Volume(db) intensity

fig 2

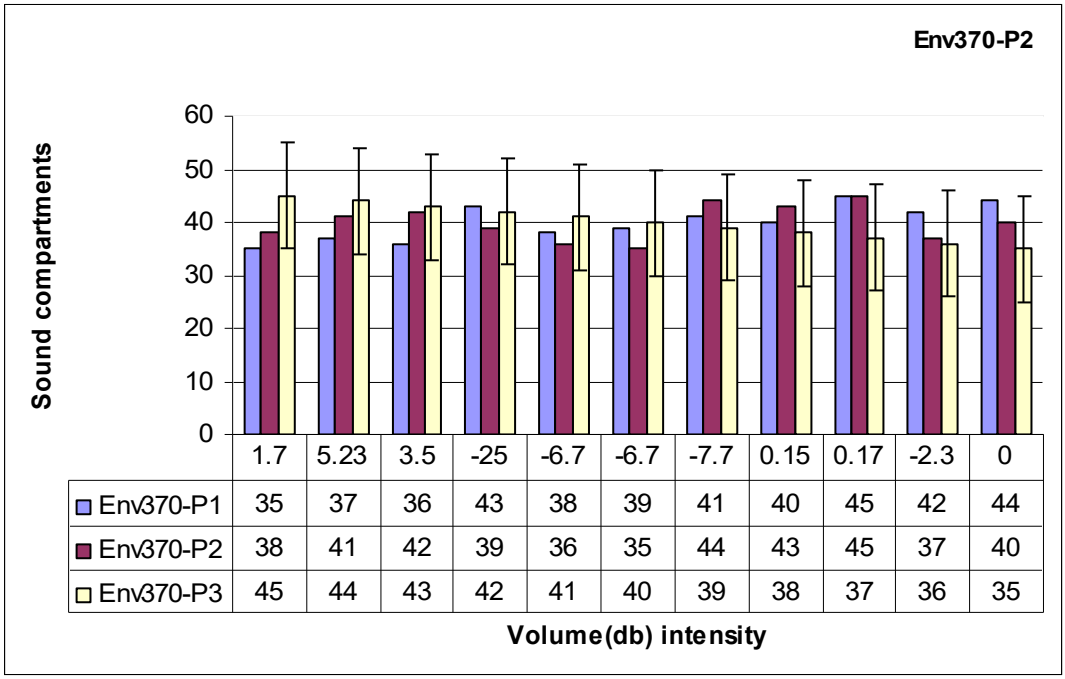
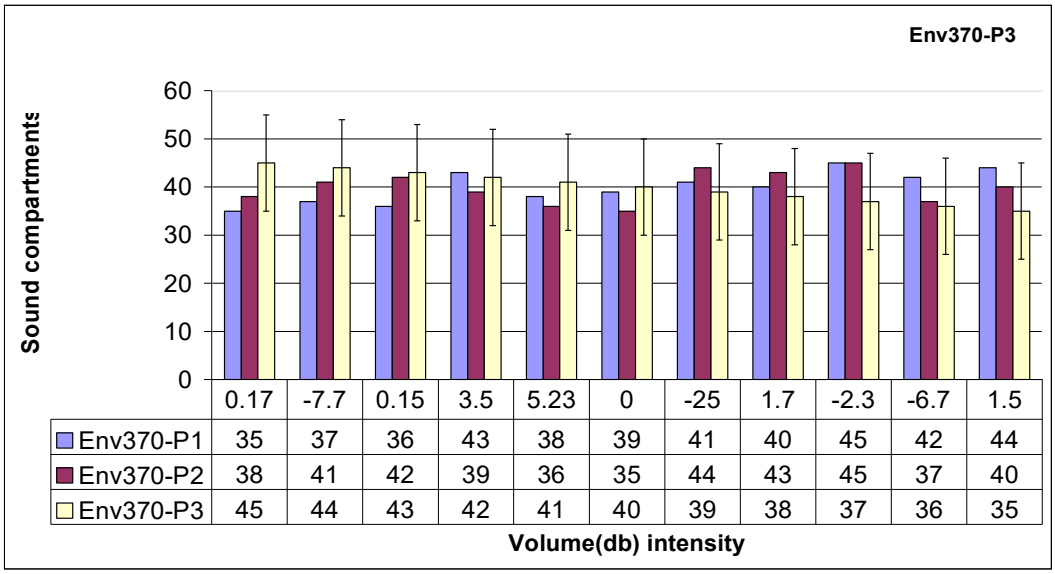

Env370-P2
Sound compartments
60
50
40
30
20
10
0
1.7 5.23 3.5 -25 -6.7 -6.7 -7.7 0.15 0.17 -2.3 0
Env370-P1 35 37 36 43 38 39 41 40 45 42 44
Env370-P2 38 41 42 39 36 35 44 43 45 37 40
Env370-P3 45 44 43 42 41 40 39 38 37 36 35
Volume(db) intensity

fig 3



	0.17	-7.7	0.15	3.5	5.23	0	-25	1.7	-2.3	-6.7	1.5
Env370-P1	35	37	36	43	38	39	41	40	45	42	44
Env370-P2	38	41	42	39	36	35	44	43	45	37	40
Env370-P3	45	44	43	42	41	40	39	38	37	36	35

fig 4

fig 2, fig 3, fig 4 *above showing different intensities created [Env370-P1,P2,P3] resulting in audio variation changes creating environments within one another producing different sound evolutions.*

Matlab methodology :

minutes	Introduction of bundled sound fragments *[to Matlab]*	Developed sound fragments
1	23	95
2	49	140
3	117	223
4	232	459
5	211	474
6	93	177
7	346	643
8	298	337
9	234	350
10	70	85
10.4	44	87

fig 5

3070 ***Matlab*** *developed sound fragments made in 60 second time intervals used in A[EV]3070/7f.*

Complex Systems :

“Colonial” sound fragment **73** constructed from a variety of combinations of (**1-4)** subordinate sound fragments namely:

*'colonial ' sound fragment **73***

subordinate sound fragments - 1] a/73, 2] g/73, 3] c/73, 4] l/73

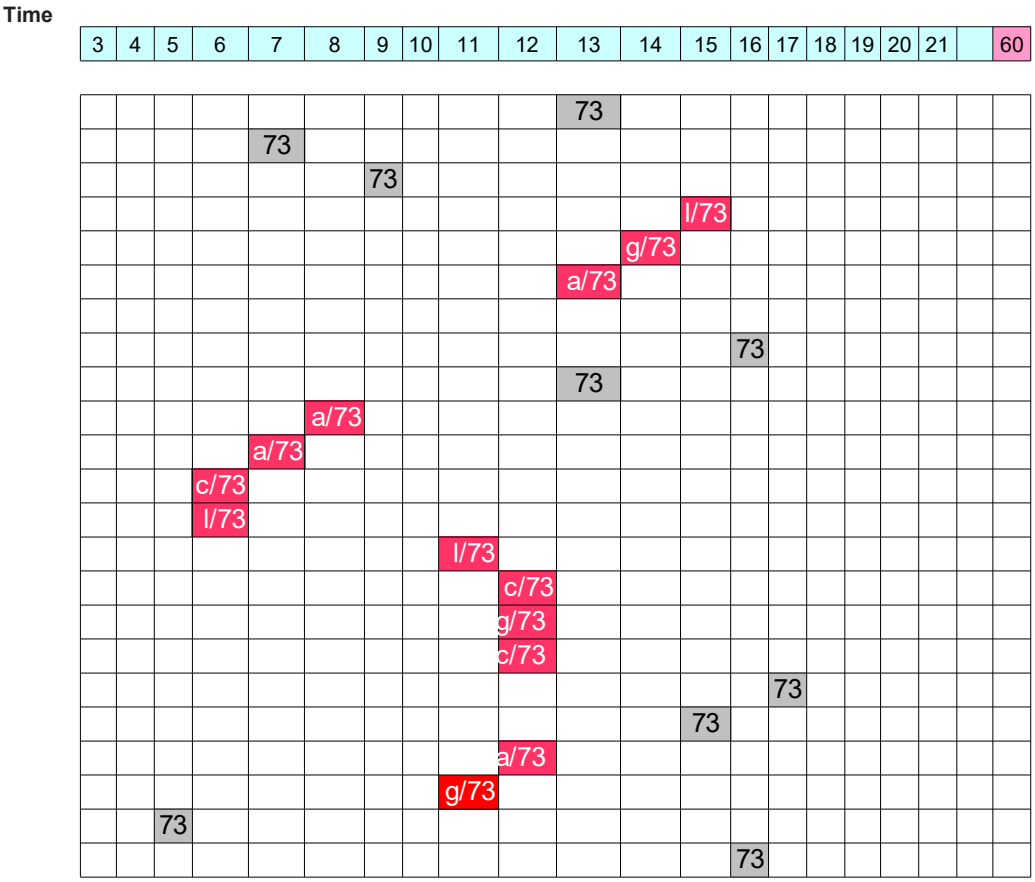


fig 6

23 assembling fragment selection processes within 180 second time interval. The biological selection resulted in 4 sound placements. The highlighted data similar to clade formations [each with different density, velocity, pitch and intensity but similar duration] - sound fragment 73 .

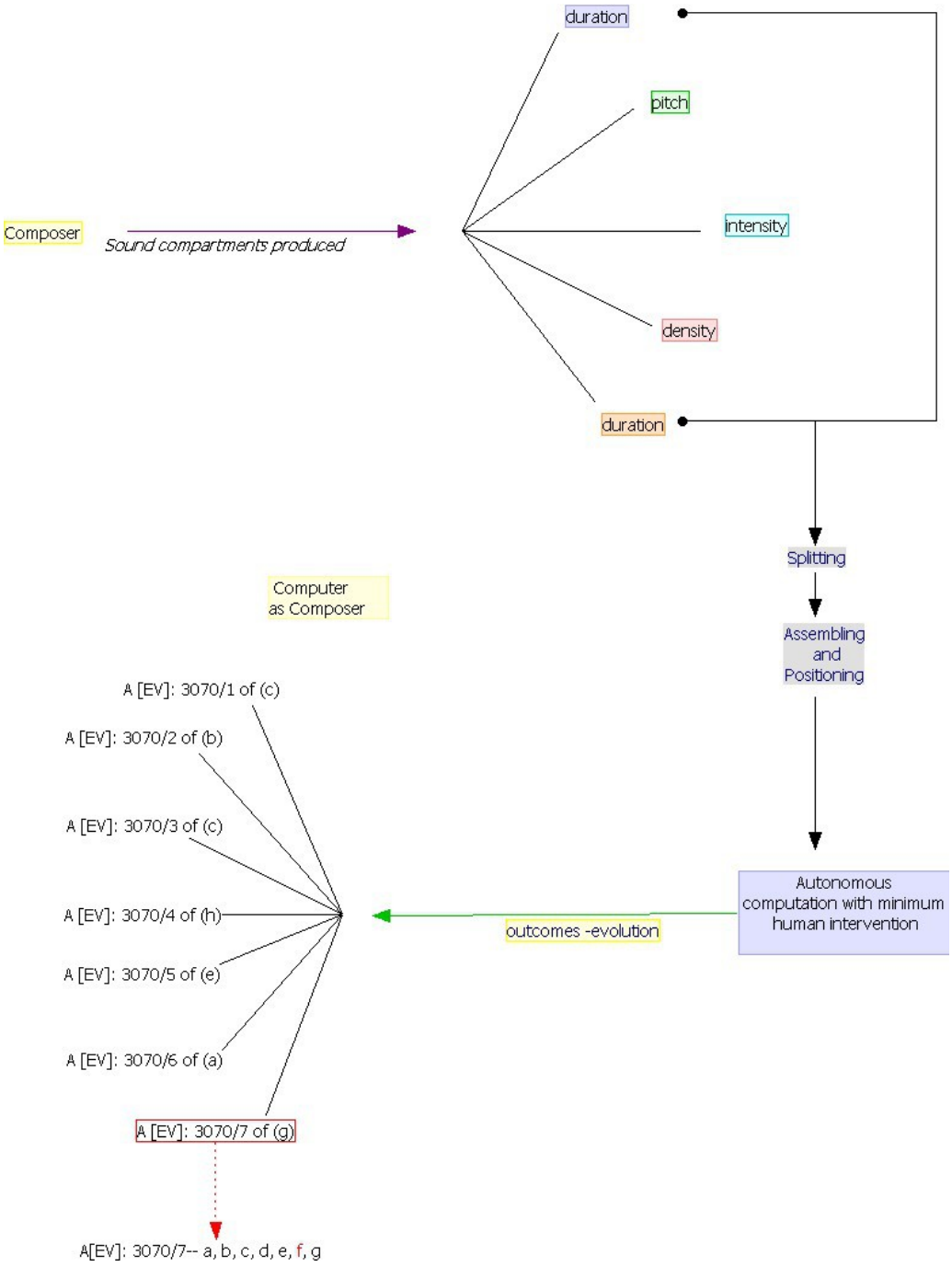


fig 7

Composer / Computer process of decision making in outcomes artificial evolution

Performance:

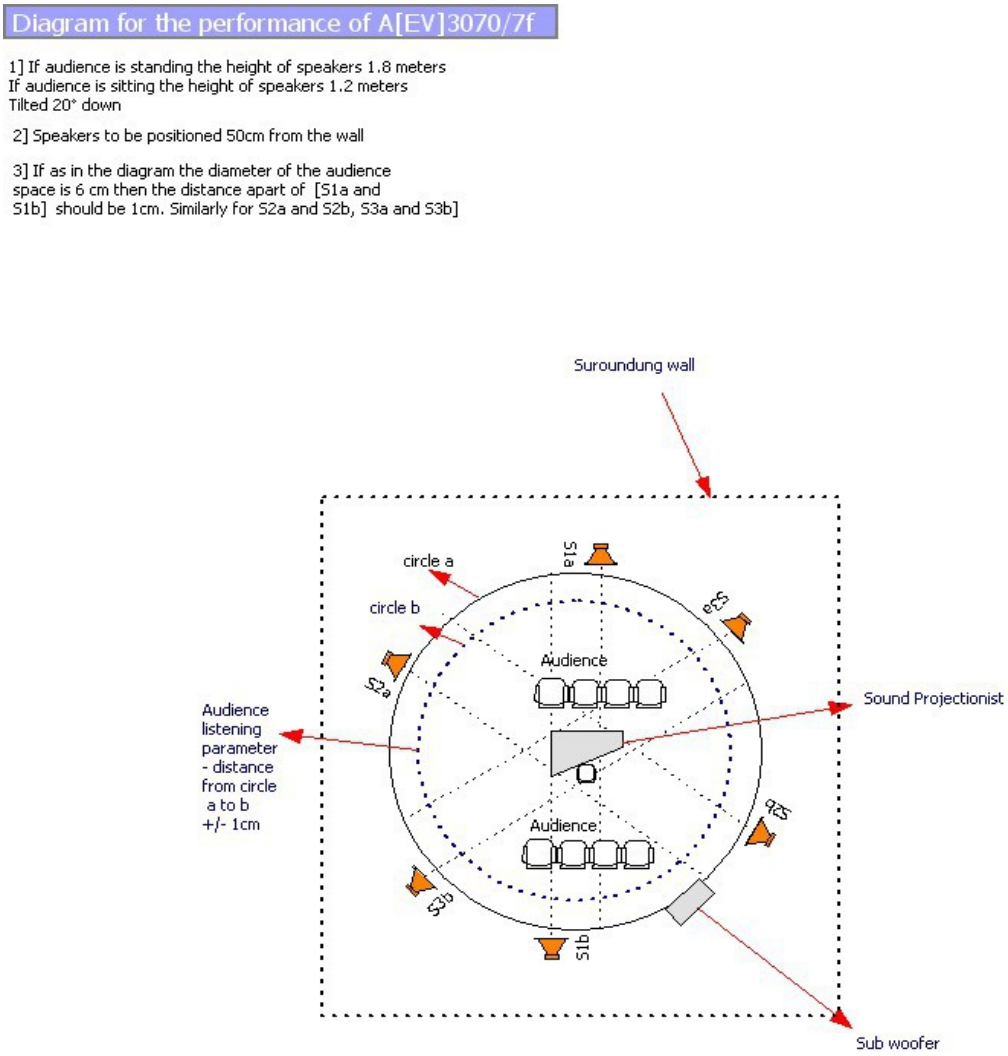


fig 8

1] 6 active audio speaker monitors and sub-woofer.

2] All channels to be positioned a +6 db throughout the performance.

3] A [EV]: 3070/7f is to be performed in total darkness *[only minimal light for sound projectionist].*

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