

Martha Brech

Composed Space in Luigi Nono's Live-Electronic Composition *Prometeo*

Research project: History and Technology of Musical Spaces

Audio Communication Group, Technical University Berlin

martha.brech@tu-berlin.de

Introduction

Among the electroacoustical space compositions of the pre-digital era, Luigi Nono's *Prometeo, tragedia dell' ascolto* (1985) is extraordinary—not only because it is still performed regularly today, it is also an extremely complex work of the mixed category. Nono composed it as a texture of interwoven musical fragments, some based on lyrics that Nono had fragmented and rearranged from a libretto by Massimo Cacciari's which itself was based on antique Greek mythologies, Aeschylus' Prometheus tragedy, and modern literature excerpts from Friedrich Hölderlin and Walter Benjamin. Performing the work requires four orchestra groups, solo wind and string groups, a glass soloist (used as percussion), a mixed choir, a group of five solo singers and two speakers, a huge amount of equipment for live electronics (such as harmonizer, vocoder, reverb, delay, a sound motion device called *Halaphon* etc.), and at least twelve loudspeakers. Each group of musicians and each loudspeaker are placed on an individual position in the performance hall.

Because until today only little was known about precisely how space is involved in the composition and what its functions are therein, the focus of my research project on spatial composition in the analogue era lies, at the moment, on the spatial aspects and their composition and representation in *Prometeo*—and that is also the focus of this paper. As many spatial aspects as possible ought to be analyzed, as well as their interaction with other parameters of the composition.

Analysis preparations: Restoration of a performance

Space is a rather fluid musical parameter that has to be adapted to every performance venue. Therefore, one single performance was chosen for the analysis: the premier series of the final version performed in Milan 1985. Its spatial setting was restored in a 3D graphic model on the basis of Nono's handwritten score and sketches; photographs of the Milan performance series; technical sketches and annotations to the score made by Hans Peter Haller, head of the Experimental Studio in Freiburg and co-inventor of the *Halaphon*; sketches and annotations made by Alvise Vidolin, who performed in *Prometeo* and was one of the programmers for the *4i-System* at the University in Padua. Additional information came from several interviews

with people involved in the Milan performances; the architectural plans of Renzo Piano, constructor of the huge wooden space-in-space performance hall called *Arca*; and printed material, including scholarly studies on *Prometeo*.¹

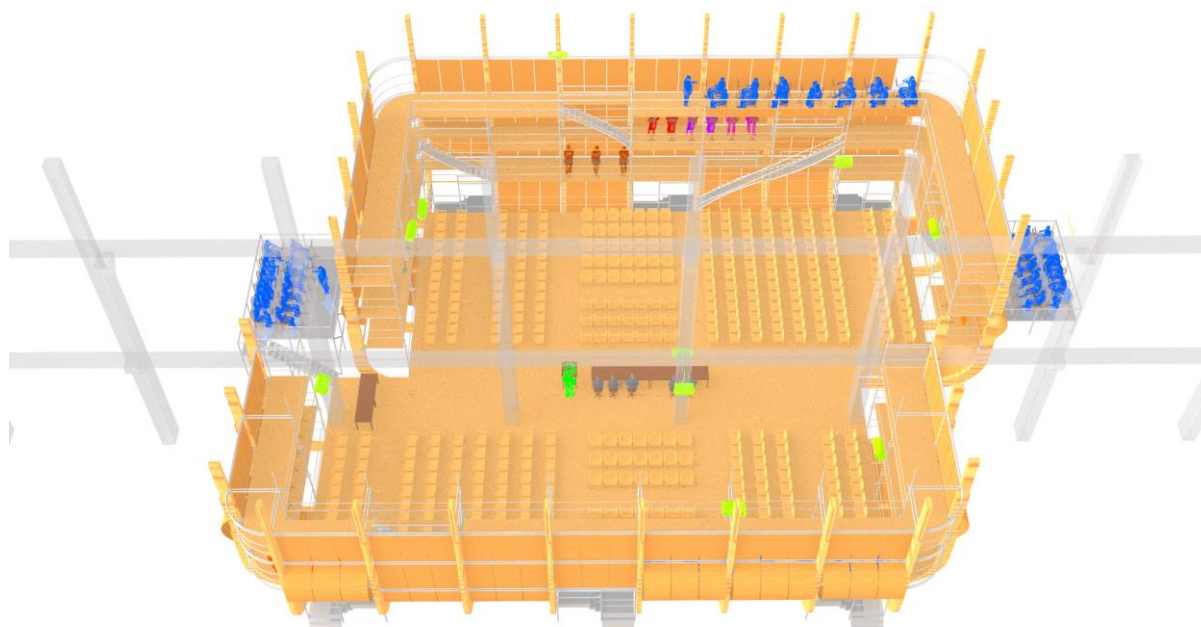


Fig. 1: Larger half of *Arca* in Milan with musicians. In red: solo singers; blue: three of the four orchestral groups; dark green: glass; light green: ten of the twelve loudspeakers (those in the adjacent halls are not displayed). 3D model design: Anna-Lena Vogt; analytic views: Martha Brech and Jan Schlenkermann.

In Milan, the *Arca* was split lengthwise into two parts, allowing an open passage in the middle that connected the *Arca* acoustically with the adjacent halls of the modern Ansaldo building. The positions of the groups of musicians and positions of the twelve loudspeakers inside and outside the *Arca* could be restored with these sources, too. The vast majority of the performing musicians and the loudspeakers were located in the vertical loggias (up to three storeys high) at the edge of the *Arca* behind wooden walls, some of them curved so that they could be localized easily from the audience placed on the floor of the *Arca*, whereas the empty adjacent halls would first produce natural reverberation for the sounds produced by the two loudspeakers at their ceilings and then enter the *Arca* through the passage in its middle.

In the next step of restoration, the original sounds played by the musicians from the score were synchronized with the live-electronic modifications displayed on specific loudspeakers, as noted in the technical sketches. Only the soloist groups had microphones, and thus their sounds could be modified electronically:

¹ Driesen, Jeschke, Lazzarini, Moreno Soriano, and Nielinger-Vakil – just to name the authors of some of the most important writings for this study.

- 3 solo winds: flute, clarinet, and trombone/horn (all in different sizes)
- 3 strings; viola, cello, and bass
- glass (used as percussion)
- 2 speakers
- 5 solo singers (2 sopranos, 2 altos, 1 tenor)
- 12 choir singers (soprano, alto, tenor, bass)

The result of this step showed a constant change of sounding places throughout the composition and specific spatial settings in each of the nine movements, either by static sounds or spatial sound motions with a maximum of four different *Halaphon*-produced sound paths zigzagging through the *Arca* at one time. Additionally, the synchronized score showed that the sound modifications of the live-electronic devices for the solo singers, choir, and speakers are clearly connected to text levels, so that sounds produced at different places in the *Arca* form an area that is separated from other, different sound areas playing at the same time. This gives structure, at least to the different text levels, such as the ancient Greek mythology or the *Maestro del Gioco* (Master of the Game) parts that Cacciari took from Walter Benjamin's *Theses on the Philosophy of History*. The 'historical' gap between the two texts is marked here both in the sonic character of the music and in their position in the *Arca*. In other words: sonic similarities form spatial structure.

On the other hand, the four orchestra groups had no microphones and therefore their sounds were not modified electronically (only one microphone for each group was used for the soloists in 1° Isola). Nevertheless, spatial sound relations are also observable between the orchestral groups that are formed by sonic similarities.

Analysis

Analysis system

The search for similarities in the music of the orchestral and instrumental soloist parts and their live-electronic modifications concerned all musical parameters such as:

- Instruments,
- Register (pitch of sounds and intervals),
- Development of sound in time (straight, pulsations, rhythmic organization, etc.),
- Microtones (1/4, 1/8, 1/16),
- Loudness/Dynamic
- etc.

The decision whether sounds were to be considered as similar² or different followed criteria formulated from principles of perception used in gestalt psychology: The more identical aspects of sounds were to be found in the music at different places in the *Arca*, the stronger the similarity and the perception of connection or unity among sounds—and vice versa. None, or only a few, of the identical aspects will be perceived as a different, contrasting sound gestalt that may or may not form unities with sound similarities in other locations.³ Another contrast is silence, which Nono understood as spatial.⁴

² In fact, identical music at two different places in the *Arca* is never written in the score.

³ See the contribution by Klaus Kropfinger (1991), who understood contrasts as important elements in *Prometeo*.

⁴ Nono sketches ALN 51.38.01/03-05.

Analysis results

The analysis of *Prometeo* gestalt entities in space resulted in the detection of multiple spatial forms that change in time throughout the entire composition. They are active on all levels of the composition and can be classified as

- a) Sound sculptures: sound similarities at different places (same time)
- b) Sound paths and figures: time related transport of sound similarities in space

a) Sound sculptures: sound similarities at different places (same time)

Usually, live-electronic modifications concern only a few sound parameters and not all of them. Therefore, original sounds and their electronic modifications may be perceived as a gestalt entity. Its spatial dimension is marked by the places of the original sound production in combination with the loudspeakers in use (as notated in the synchronized score).

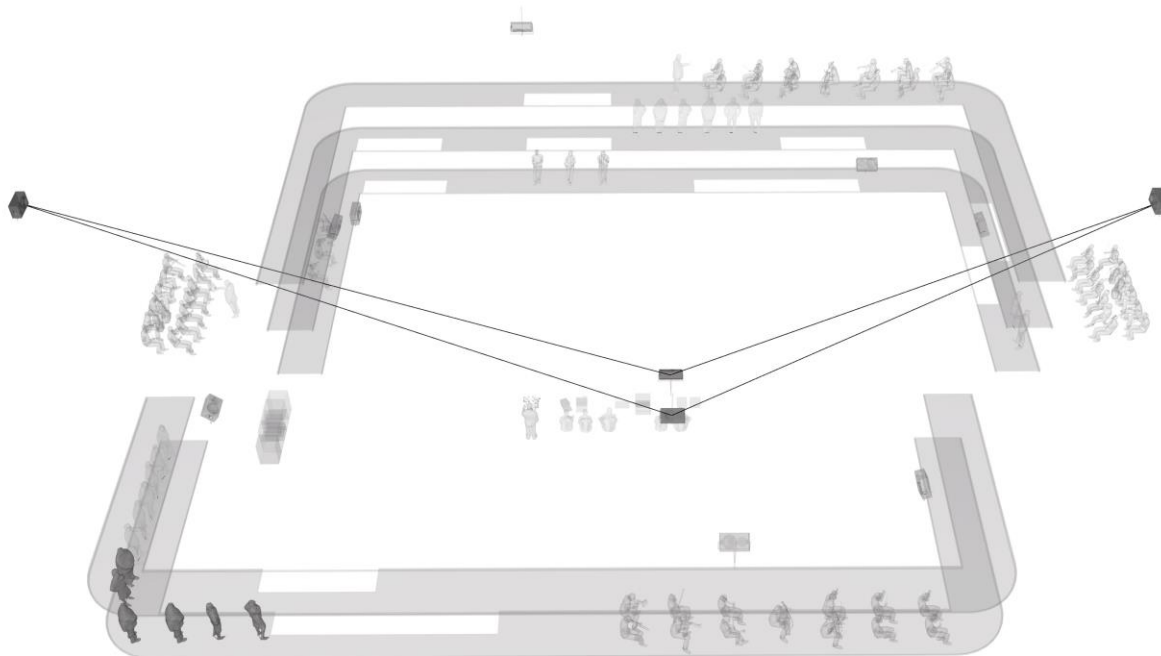


Fig. 2: Prologo, bars 1–2, a 3D-model analytic transparent view. The female voices of the choir sing “Gaia (gave birth)” (Gaia: name of mother earth in ancient Greek mythology). The sound of their voices is electronically modified by an extreme reverberation effect. The natural sound and its modification are both displayed separately by the four loudspeakers in the centre and outside the *Arca*. Nono called their combination with the natural reverberation of the adjacent halls *coro lontanissimo*.

If groups of musicians at other positions play very similar sounds, they too are understood as part of the gestalt entity. If sounds and live-electronic modifications are different, they form another spatial gestalt entity that might exist in parallel as a kind of sound-space counterpoint⁵ or as a spatial sound polyphony. They occupy specific spatial areas and so form parallel audible sound sculptures or spatial silence regions that change in space and time.⁶

⁵ Dal Molin (2016) describes this for many of Nono’s compositions. In his article he cites Paul Winter (1965), who first described the idea of a spatial counterpoint (*Kontrapunkt der Flächen*) in Renaissance polychoral music. Nono had a copy of this book in his library.

⁶ Nanni-Schmusch 2004, p. 50.

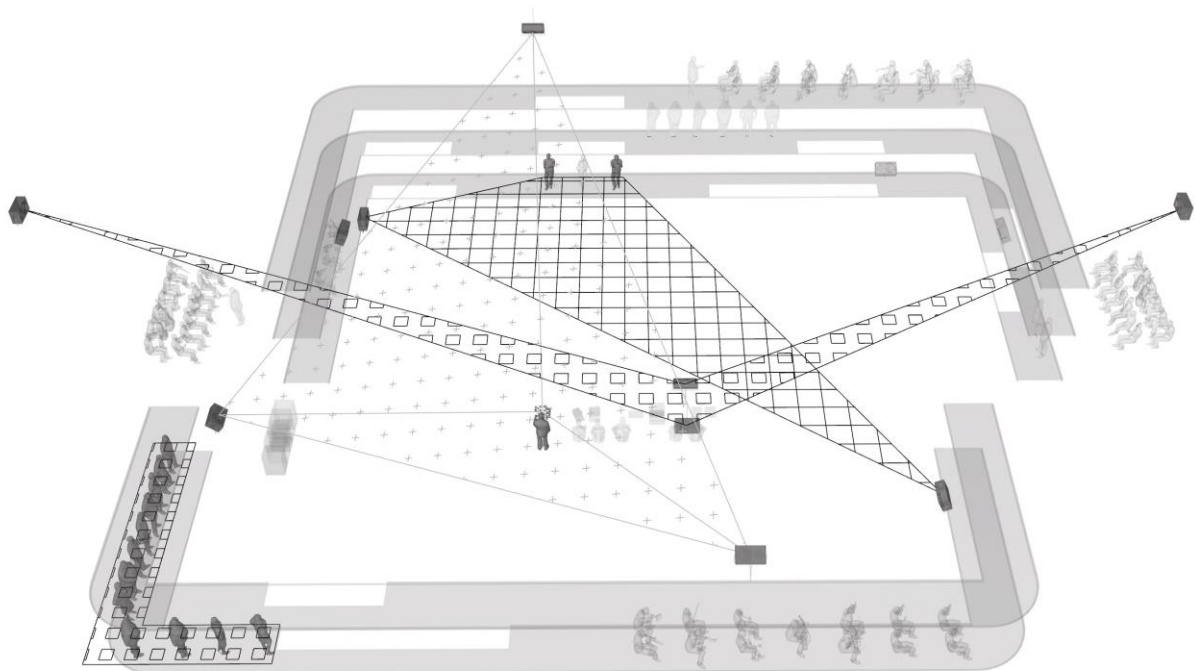


Fig. 3: Prologo, bars 32 ff., three different sound entities. 1st: *Coro lonantissimo* singing the word “Urano” (name of the god of mountains in ancient Greek mythology). 2nd: Solo winds (bass clarinet and tuba) with microtonal modifications and their loudspeakers. 3rd: Glass modified by low transposition (by about two octaves downwards) and extreme reverberation on all loudspeakers.

b) Sound paths and figures: time related transport of sound similarities in space

In *Pometeo*, there are two different ways to transport sound in space:

- a) continuous transport by means of *Halaphon*.
- b) stepwise transport between spatial positions of live musicians.

ba) continuous transport by *Halaphon*

The *Halaphon*, a unique device developed by Hans Peter Haller, head of the experimental Studio in Freiburg, and his friend the engineer Peter Lawo, used the effect of phantom sound sources that appear when two loudspeakers play the same sound; the balance of volume between them produces the spatial position of this acoustic phenomenon. Therefore, a regular movement could be produced by constantly changing the balance between two loudspeakers and by its control. The *Halaphon* could produce sound paths precisely by definition of balance durations between defined loudspeakers (the loudspeaker numbers were written in the technical sketches).

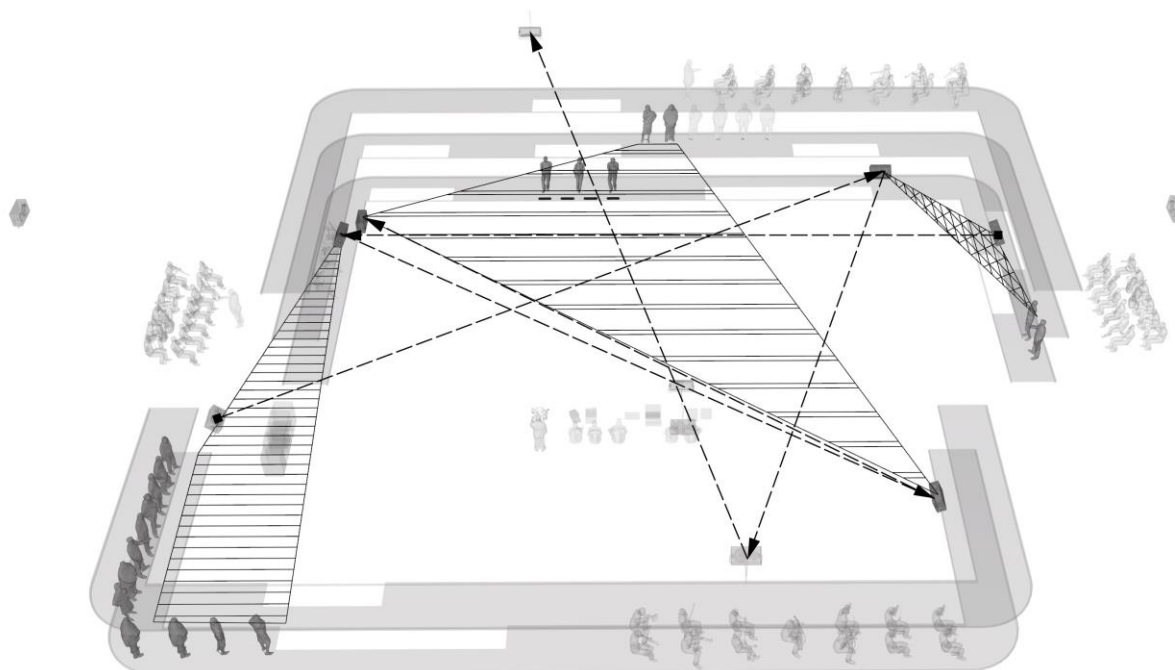


Fig. 4: Prologo, bars 177 ff. Two *Halaphon* sound paths are shown, both are connected to the solo winds group. A dot marks the start of the path, the arrowheads indicate their direction. The complete pathways are shown here although in the two bars 177 ff. they might have covered only a part of the path. The other parallel sound entities are: speakers (at the right) and the two loudspeakers next to them, choir and solo singers (two sopranos). They sing “sanno comporre” (they know [how] to rebuild) from the “Maestro del Gioco” text level that is based on Walter Benjamin’s *Theses on the Philosophy of History*. Only the solo singers are electronically modified (microtones are added). Because singers and choir also sing slightly different music, they are understood as variants and marked as such.

bb) Stepwise transport between spatial positions of live musicians

The sound transport between spatial positions of live musicians⁷ occurs especially between the orchestral groups. Due to their position, different sound figures appear, such as left or right turn, crosses, etc.

Usually the duration of these figures is shorter than the *Halaphon* pathways, which last for several bars. The short exchange of sounds between the orchestral groups supports the perception of spatial figures, but this makes the spatial figures a part of a sound entity rather than a part of its spatial character. Thus, the following example is not typical for sound figures, because the stepwise sound transport between the orchestral groups is not only an essential part of a spatial movement, but their sounds also interact with the preceding *coro lontanissimo* sounds (fig. 5a). The four violins from two orchestral groups pick their final notes d^2 and a^2 and their microtones in bar 3 until the middle of bar 4 (fig. 5b). Then their notes are transported to the four violins of the other two orchestral groups while the violins of the first two orchestral groups play the upper or lower octaves (fig. 5c). The beginning section of only five bars includes the entrance of external sounds into the *Arca*, their transfer, and the initial processing by instruments in the *Arca*—thus interpreting “Gaia gave birth” in space.

⁷ In traditional spatial music like the Venetian Renaissance *cori spezzati*, this stepwise transport of sound can also be heard. Nono, a native Venetian, referred to this compositional style and composed with it in many variant forms, starting with his *Diario Polacco* (1958).

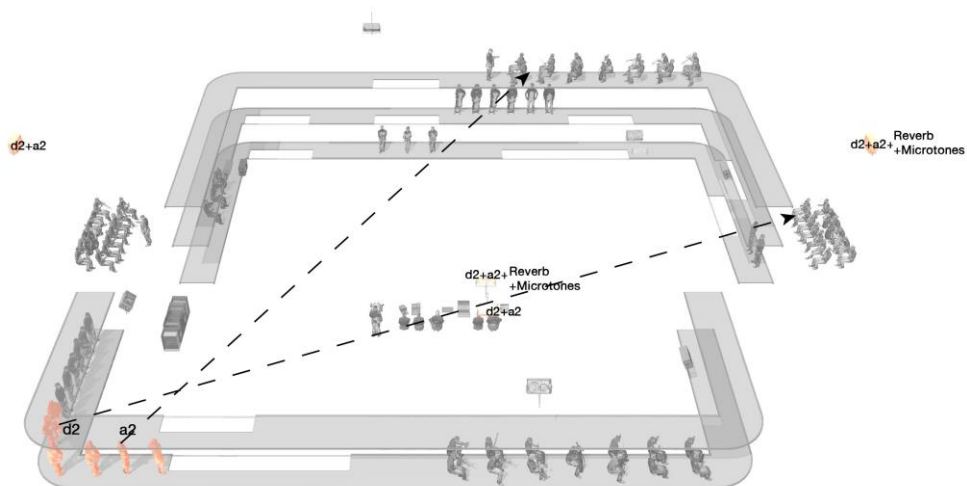


Fig. 5a: Prologo bars 1 ff. (a variant of the graphic in fig.1). The dotted lines only show the directions to which the notes sung by the choir will be transferred from bar 3. There are no sound pathways.

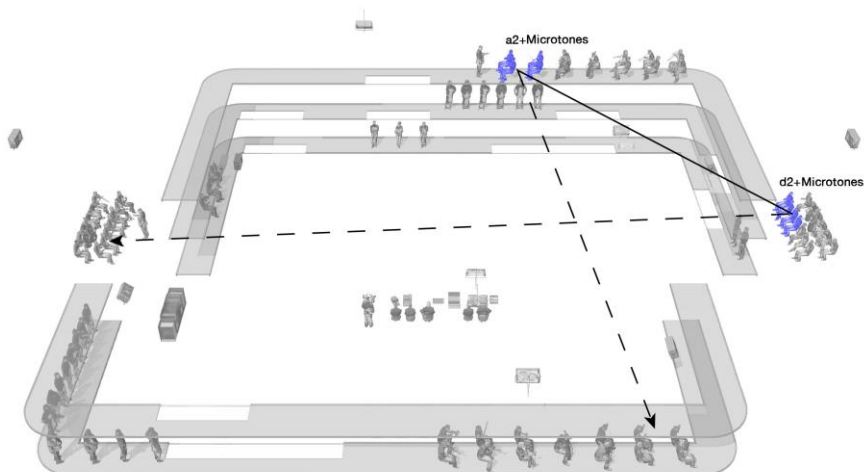


Fig. 5b: Prologo bars 3 and 4 (middle). Active musicians highlighted in red (choir) and blue (violins).

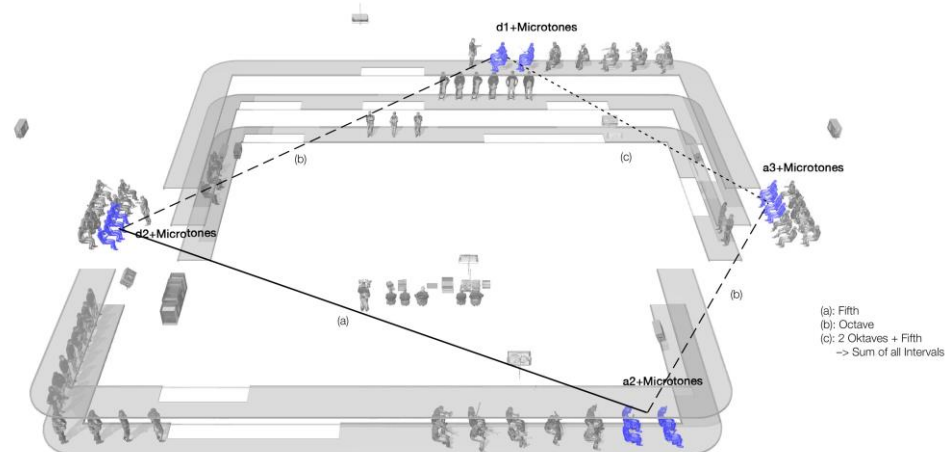


Fig. 5c: Prologo bars 4 (middle) and 5.

Conclusion

Only a short systematic of spatial aspects and a few examples of how Nono had composed space in the Prologo of *Prometeo* could be shown in this article. Nevertheless, they demonstrate how Nono composed space and how he linked space to other aspects of *Prometeo*, such as the libretto and its different levels. A complete analysis of the spatial aspects in *Prometeo* can be expected to give more details. It's currently in progress...

References

- Score reference: Luigi Nono: *Prometeo* (Versione 1985) Ricordi Milan.
- ALN: Archivio Luigi Nono, Venice.
- Dal Molin, Paolo: “ ‘Der Kontrapunkt der Linien ist durch den Kontrapunkt der Flächen abgelöst.’ Il Modelli policorali storici nella prospettiva di Luigi Nono,” in: *Schweizer Jahrbuch der Musikwissenschaft*, Neue Serie 33, (2013), Bern 2016, pp. 213–238.
- Paula Driesen: “Denken in woorden, denken in tonen; De samenwerking tussen Luigi Nono en Massimo Cacciari aan *Prometeo* (1984/85),” in: *Documenta 1*, 2015, pp. 128–178.
- Lydia Jeschke: *Prometeo. Geschichtskonzeptionen in Nonos Hörtragödie*, Stuttgart 1997.
- Klaus Kropfinger: “Kontrast und Klang zu Raum,” in: Kolleritsch, Otto (Hg.): *Die Musik Luigi Nonos*, Studien zur Wertungsforschung vol. 24, Wien, Graz 1991, pp. 115–144.
- Giulia Lazzarini: *Luigi Nono: spazio e compositione*, Bologna (PhD dissertation) 2014.
- Susana Moreno Soriano: *Arquitectura y Música en el siglo XX*, Barcelona 2008.
- Matteo Nanni, Rainer Schmusch (ed.): *Incontri. Luigi Nono im Gespräch mit Enzo Restagno*, Hofheim 2004.
- Carola Nielinger-Vakil: *Luigi Nono: A Composer in Context*, Cambridge 2015.
- Paul Winter: *Der mehrhörige Stil*, Frankfurt a.M. 1965.