

## **An example of evolution in electroacoustic music performance: Stockhausen's *Solo* and the creation of a soundscape**

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### **Abstract**

In our time, in everyday life, it is a regular occurrence, when walking outside in the city or in the country, to hear sounds or music mixed together with the noises of the surrounding environment or with other sounds. All these events create something different from a simple 'musical work.' We can rather speak of sound situations, of 'soundscapes' and even of 'musical works', but not in the classical sense of 'work' as a set and defined event. With the increased evolution of technology, the conception of musical 'work' has gradually changed. It has become even more an expanded sound event, with the addition of noises, of sound effects and participant in other aspects of artistic expressions. Multimedia installations, 'soundscapes,' are all events not only to be heard, but also associated with other aspects of perception. There are also many examples of musical works conceived at an earlier time that have been transformed by technology and are still relevant. One of the many interesting examples, certainly not the only, of this is represented by Stockhausen's *Solo*, for a melodic instrument and feedback, a composition of 1966, an early time in the history of electroacoustic music. It was performed in the '60s with analogic techniques, subsequently with digital ones, and now there are different experiences coming up to make from this composition an improvisation and even a real 'soundscape'. An emblematic piece to show how the evolution of technological means has transformed the conception of musical 'work'.

### **Background and aims of the project**

The goal of this project is to show how the evolution of technology has changed the conception of a musical work in time and has affected a work as *Solo*, turning up to create an improvisation and a 'soundscape'. We try to do that showing the evolution of the work from the initial form realised by the composer to the current achievements in the different performances that involve the use of recent technological applications that modify in part the original features. We will see:

1. The instrumental score and the feedback realisation in the original version;
2. Some recent versions with different instruments and new applications;
3. An example of realisation of the work as a 'soundscape'.

From the original versions to the most recent ones, in each performance, the piece is recomposed differently. Also it can be interpreted as an 'open work' and the different

versions can be analysed as different performances. The electronic processing is conceived in the original version with analogic instruments and has undergone several transformations. In the '90s the first digital versions were realised and recently there have been created new applications for an interactive performance. In some recent projects we have a proposal to turn the piece into an improvisation and even into a 'soundscape', setting it especially outdoors. The goal of our research is therefore an analysis of *Solo* to define its characteristics to highlight the evolution of the piece to a new function (improvisation, soundscape, etc.) made possible with the new technologies. At the same time we try to show the conception of the piece and the transformation of it through technological evolution. Many conclusions were reached through a 'workshop' aimed at re-composing the piece for performance. Important contributions for the analysis of the piece are the indications by Stockhausen himself that provides a detailed explanation of the work for the realisation of a version (Stockhausen, 1966). Both the re-composition of the instrumental score and the choice of parameters for the electroacoustic part are explained by the composer. In this explanation we can find the main rules to prepare the different versions, how to choose the parts of the score, the criteria for the combination of different sound effects and finally the different 'Formschema' of the live electronic performance conceived using the magnetic tape.

## Contribution to the analysis

### The instrumental score

The score has two sections: the instrumental one and the Formschema for the feedback realisation. On the instrumental part we find the indication: 'for melody instrument'. Also it is possible to use different instruments with a very different extension. This is a first element of variety in the realisation of this work and is planned from the composer himself:

The pitches are notated within a range of ca. 3 octaves [...] If an instrument with a compass of 4 or 5 octaves is chosen, then all notes in the upper octave may be transported up one (or two) octave/s and/or all notes in the lower octave down one (or two) octave(s). (Stockhausen, 1966: 13).

The instrumental score is composed from six pages into them the performer can choose the materials for 'recompose' his own version. One of the 6 pages of the instrumental score is showed in fig. 1. Also each version of the piece will be different from the other in the sense of musical form and of musical materials because each performer will compose an own version. This re-composition is not completely free. There are some rules for the composition of a version explained from the composer. An important indication is to emphasize the characters of the used instrument using different kinds of timbres, there are in fact indications for obtaining different ways of sound production. "Four different timbres are prescribed: N, I, II, III. Arrows between these symbols indicate continuous transitions between timbres" (Stockhausen, 1966: 13). For example in the flute version, the composer suggests to use a flute, a piccolo flute for the first two timbres and to emphasize harmonic overtones or to use simultaneously hummed tones for the timbre III and IV: "in a version for a flutist the following timbres were used: N = flute, I = piccolo flute, flute with emphasized overtone content and recorder, II = flute with simultaneously hummed tones, III = alto flute" (Stockhausen, 1966: 13). In addition to the indications for the instrumental part there are those for the realization of the feedback. We have six different Formschema, for the realisation of the 'feedback'.

# SOLO

The image shows a page of musical notation for the piece 'SOLO' by Stockhausen. It consists of several staves of music, each with various performance instructions. The instructions include 'ACCEL.' (accelerando), 'RIT.' (ritardando), 'L. SEHR GERÄUSCHHAFT' (very noisy), 'ETWAS GERÄUSCHHAFT' (somewhat noisy), 'VIEL PERIODISCH LANGSAM' (very periodically slow), 'ETWAS PERIODISCH' (somewhat periodically), and 'GERÄUSCHHAFT' (noisy). The notation includes notes, rests, and dynamic markings such as 'pp' (pianissimo). The piece is written in a complex, multi-layered style characteristic of Stockhausen's electroacoustic music.

Figure 1: one of the 6 pages of the instrumental score

## The realisation of the feedback in the original version

The electronic part of the piece (feedback) is indicated into six different Formschema. The number six is one of the Stockhausen's 'magic' numbers used in many compositions. The performer must choose one of the six Formschemas for his performance. In each of them there are six parts, A, B, C, D, E, F, with different durations. For example in the Formschema I the first part is divided into 6 episodes during 11 seconds, the second one into

8 episodes from 14,2 seconds and so on. In the Formschema II, showed in the example 2, we have the six episodes with different durations: A =12 seconds X 9 times, B = 24,2 seconds X 7 times, C = 6 seconds for 11 times, D =8,5 seconds for 10 times, E =30,4 seconds for 6 times, F =17,5 seconds for 8 times. The duration of different episodes is strictly defined and must be observed for the creation of the feedback.

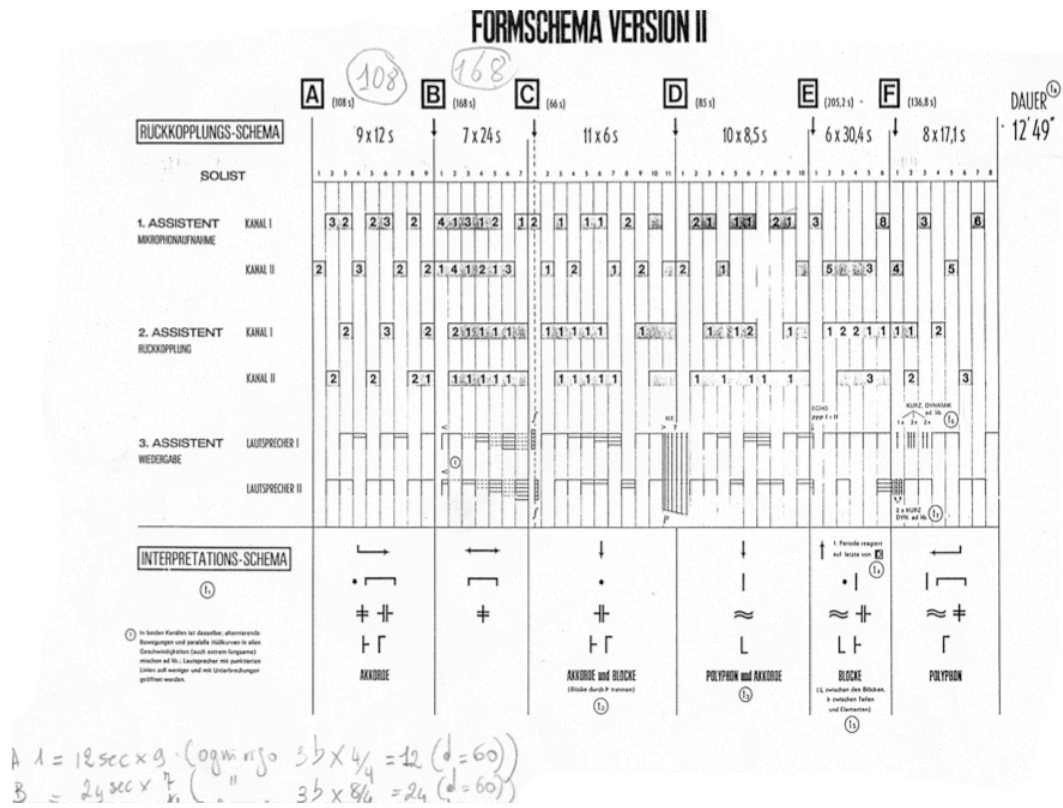


Figure 2 : Formschema version II

The performer plays according with the durations indicated on the chosen Formschema. The sound will be kept from a microphone and recorded to create the feedback. The feedback in the original version from 1966 was obtained using a magnetic tape. In the original score we can find an explanation of the technical realisation. The performance required 3 assistants as showed in the fig. 3.

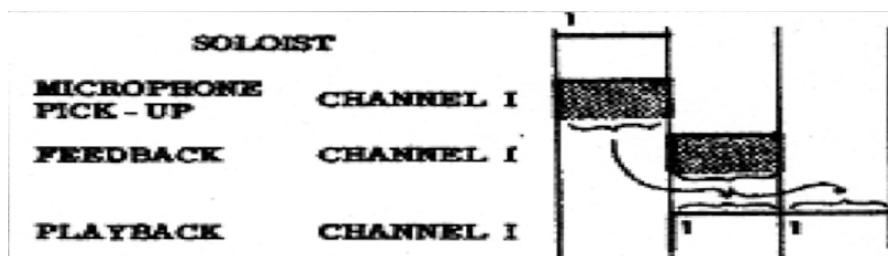


Figure 3: technical realisation of 'Solo'

In every Form Scheme there is a Feedback Scheme. Three assistants control: 1 Microphone pick, 2: feedback, 3: playback. A 4 assistant controls the switch over of the playback and gives the soloist as well as the others three assistants signals at the beginning of every period. (Stockhausen, 1966: 18).

In each Formschema we have other indications regarding the interpretation called 'Interpretationschema'. Arrows indicate the relationships between different episodes of the schema or different pages of the score.

## Influence of technologies evolution on the performance of *Solo*

The evolution of *Solo* begins with the evolution of digital technologies. Many different versions are made in parallel with technological progress. Already in the '90s there have been proposed the first experiences of digital implementation of *Solo* using algorithms that replace the magnetic tape. An example of a digital implementation was realised in 1996 with the MARS (Music Audio Research Station) in the MM&T Studio in Milan and is described in my article *Software for the definition of instruments in electroacoustic music: Mikrophonie I and Solo* (Sargenti, 1995). From the initial version of the score explained by the composer we have today a lot of different versions of the live electronics realised with digital technologies. The electronics part is based primarily on the effects of delay and feedback in addition to other optional effects. Currently there are many interesting solutions for the realization of the feedback and the effects. Even interactive solutions. Examples can be found on the network. One of these is a recent application for Ipad and Iphone that allows the performer to execute and monitor the entire performance without assistants. Implemented from Enrico Francioni and Alessandro Petrolati and described in a Tutorial: "SOLO [Nr.19] is an algorithm that aims to implement digitally the original analog set-up for the performance of six versions of *Solo*, for a melodic instrument with feedback by Karlheinz Stockhausen." (Francioni, 2014a) In the main screen of the application (fig. 4) we have on the left side 6 buttons. With these the performer, after to have built his own instrumental version, can choose the Formschema. Starting the application, the performer plays on the chosen Formschema following the indications on the display.



Figure 4: main screen of the application *Solo* for iPad and iPhone

Different interesting performances have been realised in this way: in the demo version of the application there is the double bass version by Enrico Francioni. Another very interesting experience is the version for voice by Laura Muncaciu. The composition has no lyrics. Also a

new element is represented from the improvisation of a text. Lyrics are composed by the singer using different sources (Muncaciu, 2015). All these examples realised using the Ipad application are examples of a transformation of the original composition into something different from the composer's original idea, but coherent evolutions of it. We have a simplification of the technical requirements and an increase of performing possibilities. From the interactive use of the described application, it derives a recent experience of *Solo* that conduced toward a really 'soundscape'.

This is the version with voice and instruments, double bass and saxophone performed outside in the Ancona's harbour in September 2014, made possible from the mac Ipad application and from the use of another recent application called WeMust. This consists in a Wi-Fi technology for networked performances (Gabielli et als, forthcoming). This 'soundscape' performance, is named 'Waterfront'. All the mentioned contributions are aimed at showing the evolution of the concept of 'work' in the different versions made possible by technological evolution. Taking into account the possibilities offered by the technology that enables the performer himself to control the various stages of implementation, we have tested the construction of different versions of *Solo* in a workshop with different performers. It's also possible to compare other different versions of the work *Solo* not only from the point of view of technology, but also from the point of view of the differences between the instrumental realisations and the formal re-composition of the score.

## Conclusions

*Solo*, written in 1966 by Karlheinz Stockhausen, a pioneer of electroacoustic music, is an example of the evolution of the concept of 'work' by means of technologies.

From the beginning, in the conception of the composer himself, *Solo* is a piece in which we can find a character of open performance. In fact, in this work there is the possibility for the performer to organise the score in a personal way. The performer can choose inside the score the points and the passages to build his own composition. He can choose, from six different versions, his own performance version with specific characteristics.

Also, one of the structural features of the piece is to be different even in each performance in the instrumental and in the electronic parts.

These structural features are emphasized in the course of time by the technological evolution. In fact, the new technologies allow us to realise not only a personal interpretation of the score as in the original idea of the composer, but also a different conception of the work until we get an idea of open work and soundscape. This latter possibility has been tested recently in a waterside concert.

## References

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