The Meta-Orchestra: research by practice in group multi-disciplinary electronic arts

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Group multi-disciplinary projects face difficult challenges in social collaboration, diverse technologies and aesthetic grounds. Combining sound, image and space into a sufficiently malleable set of materials for creation is a complex task. As such projects lack a common ground from which to start, an experimental, practical approach is suggested, with a non-hierarchical, informal group structure. The Meta-Orchestra project, tackling these problems since 2000, re-engaged with the issues in a fourth meeting in Maastricht in 2004. This paper lays out the context of multi-disciplinary work, influenced by developments in computer technologies, by outlining the changed roles of the orchestra, the score and audio-visual theories. The Meta-Orchestra is described against a theoretical frame of social, technical and aesthetic considerations. Although the project will not be forced into this framework, descriptions of the palette, the strategies to create common grounds, the areas opened up by wireless network technologies, aesthetic issues of layering sounds and images, and the development of a central score system, illustrate the layered complexities of the Meta-Orchestra.

1. INTRODUCTION

The Meta-Orchestra, as an ongoing evolving project, embraces an experimental approach to the challenges of creating within complex, multi-layered projects, which use new technologies. Research by practice appears to be a contradiction in terms, as does 'experimental theory', but if the definition of experimental is that the outcome cannot be predicted in advance, then strategies to make use of experimental processes can yield results that may otherwise not have been reached. There is a tension between wanting to control, predict and compose the outcome of a project, and allowing risky elements to grow and be discovered throughout the experimental process.

The new tools of portable computer technology available to most artists today are a reason for the growth in interest in collaboration across the disciplines. This phenomenon is particularly visible at present in electronic music with the availability of software that enables live video and animation to be literally 'played' alongside sound. Technology is providing the means but the aesthetic motivations are often varied and restricted to the discourse of one artistic discipline.

The borders that make the individual arts distinct are in many cases rigidly defended, not least by the institutions and social groups that support them. But the points of conjunction between these distinct arts are numerous and have a continuous history of flux. The projects described in this paper are attempts to create events that are more than just the sum of the parts, more than a collection of soloists from different disciplines, and more than a combination of very distinct image sounds and space. There is a concentration on the subversion of one form into another, sound walks through space while image is played like an improvised sound event.

This paper attempts to chart areas of commonality that enable a discourse between the different arts, particularly through the use of computer technologies. The discussion of The Meta-Orchestra project is used to outline some problems of combining different disciplines, the practical solutions, and the theoretical approaches that may enable future work. It moves beyond previous articles about earlier instantiations of the Meta-Orchestra project. The emphasis here is on assessing multi-disciplinary work and describing only the latest progressions in technologies used and the first steps towards a score.

1.2. Roots of the theoretical debate

Multidisciplinary art has a long and polemic history. A brief introduction of the near history provides a relevant context for the experiments described in the Meta-Orchestra. Comparing some key, controversial writings from the mid-1960s, it appears that the existence and survival of the individual arts is fundamentally opposed to that of the combined arts. The debate revolves around, not only questions of the specificity of materials and techniques particular to individual arts, but also to ideas of art's relation to audience or spectator.

In 1967, art historian Michael Fried argued against '. . . the illusion that the barriers between the arts are in the process of crumbling and that the arts themselves are at last sliding towards some kind of final, implosive, highly desirable synthesis. . . . in fact the individual arts have never been more explicitly

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concerned with the conventions that constitute their respective essences' (Fried 1967). His concept of theatre and theatricality, as something produced specifically by disregarding the boundaries between the arts, is seen as radically opposed to the construction of meaning and discourse within the individual arts. According to Fried, 'theatricality' imposes a distance on the audience, a sense of being overwhelmed, even excluded, a confrontation rather than an inclusion. Fried, fighting against the apparent degeneration in the arts, summarises his influential argument in the following sentences (his italics): '*The concepts of quality and value* – and the extent that these are central to art, the concept of art itself – are meaningful, or wholly meaningful, only within *the individual arts. What lies* between *the arts is theatre*' (Fried 1967).

The topics of inclusion or exclusion, of degrees of reception and participation by audience, are fuelled by current debates on interactivity and new technologies in the arts. One only has to look at the different modes of presentation of electronic music – electro-instrumental, laptop, acousmatic – to see a clash of ideologies with respect to audience involvement. The use of multiple media in one presentation, for example projected image and sound and movement, increases the density and complexity of communication. In 1964, Marshall McLuhan described his 'Media Hot and Cold'. Unlike Fried, there is no value judgement attached to McLuhan's statement as he describes a pervasive difference in our interaction with everyday media. 'There is a basic principle that distinguishes a hot medium like radio from a cool one like the telephone, or a hot medium like the movie from a cool one like TV. A hot medium is one that extends one single sense in 'high definition' . . . hot media do not leave so much to be filled in or completed by the audience. Hot media are, therefore, low in participation, and cool media are high in participation or completion by the audience' (McLuhan 1964).

Another ancestor of our present-day multidisciplinary work can be found in the 'intermedia' works of the Fluxus group. As the complete antithesis of Fried, Dick Higgins in 1966 writes: 'Thus the Happening developed as an intermedium, an uncharted land that lies between collage, music, and the theatre. It is not governed by rules; each work determines its own medium and form according to its needs' (Higgins 1966). (Notice that both Fried and Higgins are discussing the area *between* the arts, rather than a gesamtkunstwerk or *total* art.) It is in the broad area of performance arts that risk, improvisation and experiment are part of the everyday tool-set for creation.

2. THE HISTORY OF THE META-ORCHESTRA

The Meta-Orchestra began in 2000 as a European Community funded project dedicated to researching the collaborative use of computer technologies and networks in a performance environment of electronically extended instruments. Hosted by Dartington International Summer School, the project entitled Hypermusic and the Sighting of Sound was directed by Bert Bongers and Jonathan Impett. The collaborating individuals were Nicola Bernardini from the Conservatory of Music in Padova, Richard Barrett from the Royal Conservatory in Den Haag, and Ludger Brummer from ZKM Centre for Art and Media Technology in Karlsruhe. Each brought in two or three participants making the group up to fifteen people consisting of musicians, a video artist and a dancer. This early phase of the project has been written about extensively in a report (Bongers, Impett and Harris 2001) and subsequently summarised in a conference paper (Impett and Bongers 2001).

The significant elements of this first meeting, listed below, formed the basic concerns of the Meta-Orchestra meetings:

(1) To establish an experimental atmosphere and working structure based on both practice and regular discussions.
(2) An emphasis on the setting up of a cross-platform network infrastructure for the passing of sound and data between the participants.
(3) To test the experiments and bring them to a public through regular informal performances.
(4) To combine different elements such as sound, image and dance.
(5) To experiment with connecting the different physical spaces through movements of players and audience and linked by the technological network.

After Dartington there were two subsequent meetings and performances, the first in Amsterdam (De IJsbreker and Felix Meritis, 2001) and the second in Barcelona (Metronom Electronic Arts Studio, 2002) with a slightly different group including two dancers, two performance artists and a video artist. Due to serious time constraints in Barcelona, the performance was primarily a group improvisation structured by pragmatic decisions. The use of the network to share data, a feature developed in Dartington, was implemented, but did not function as the underlying communicative layer that was intended, and therefore was only present to a limited extent in the performance as a whole. The layout of the space, including the shifting of attention from one group of players to the next, formed the primary performative gesture that gave character and structure to the whole. A far greater balance between the sonic, visual and spatial aspects was achieved than in the previous Meta-Orchestra meetings. The improvised quality allowed a great freshness to the event which suggested to both the performers and audience the enormous potentials of this group work.

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The fourth Meta-Orchestra took place in Maastricht, the Netherlands, in March 2004, hosted by the Jan van Eyck Academie and the foundation Stichting Intro. This paper concentrates on discussing the areas where the Meta-Orchestra moved beyond the previous work. Technologies new to the group were used which in turn raised new issues, a different group of people participated, and the final results were unprecedented in previous workshops. The continuity lies in the structure and ideologies behind the initial Dartington workshop. For one week the group of ten created their own experimental lab and workshop environment working openly in a shared space. It has always been a crucial feature of the Meta-Orchestra that the research is openly and collaboratively approached from the start.

3. RE-THINKING COLLABORATION WITHIN THE ORCHESTRA

The professions of music and the visual arts are, to a great extent, solitary activities with many hours spent alone in the studio or practice room. Collaboration, when it does take place, is usually structured by fixed role relationships within the group. The institution of the orchestra is a typical example of what organisational psychology literature describes as a formal group structure (Furnham 1997). One player learns and practices to fill the role assigned to them, the specific content of which is prescribed from outside by the composer's score. Such structured group dynamics can barely be called collaboration as there is little or no freedom to step outside of these roles. In a group such as the orchestra, the boundary between the private work and the collaborative (and therefore public) endeavour is fixed culturally and historically and focused to form the most practical, efficient way to produce a larger work. The creative and working practices of the individual are mostly considered personal, private and unsharable, even irrelevant to the group work.

In contrast, the Meta-Orchestra has always aimed at being a flexible group for practical research and performance. One of the founding ideas was that the orchestra did not constitute a fixed group of people or specific roles, but could and should exist in any variation with changing members and an essentially multi-disciplinary character. The term orchestra was chosen as a way to describe an asymmetric collective of artists of varying specialities, where each electronically extended instrument or environment revealed a personal and idiosyncratic solution to the complexities presented by computer technologies. The added layer of a high-speed computer network connecting the players increased the potentials and complexities of group performance. It was quickly found that co-ordination and collaboration within this asymmetric group could not be resolved by one domineering score system or one approach to the structuring of space or time. New strategies needed to be developed to structurally make sense of this environment.

The following questions are raised. In a multi-disciplinary experimental environment such as the Meta-Orchestra, where the traditional roles are rendered impractical and irrelevant, how should the collaboration be structured? Are the roles a necessity or a convenience and should new roles be established? Or is an open, flexible and improvisatory approach to collaboration preferable in shaping the outcome of the work?

4. THE PALETTE

By getting together in person in a shared space for one week the group aimed to create its own dynamics of exchanging ideas, practically experimenting with the materials, and critically assessing the results. The research approach encompassed a high degree of flexibility and critique, where each member brought in their own area of expertise and opened it up to the others in a way that encouraged the orchestra to develop a common ground of vocabulary. A simple way to start was to list the various expertises and technologies of the group and assess the palette available to us. (The cultural background of each is also mentioned in the list, as the cultural diversity of the group is an issue.)

- Jonathan Impett (GB) plays the **Meta-Trumpet** (Impett 1994), a trumpet extended with various sensors to create a gestural environment that interacts with his algorithmic computer system. He is also a baroque trumpeter. Joining on the last day, Jonathan was present for the final presentation.
- The **Tromboscillator** of Hilary Jeffery (GB/NL) is a trombone extended with electronics, a mute adapted with various sensors and peripherals such as foot pedals and strobe lights. The sound processing is made in the programming environment Max/MSP with which he extends the acoustic sounds of the trombone into electronic sounds by various filters and feedback.
- The **Eraser-recorder** played by Cesar Villavicencio (BR/NL) is an electronically extended contra-bass recorder fitted with a variety of continuous sensors and switches. With these he controls the recording and playback of material sampled in real-time, again using the programme Max/MSP. He also plays baroque recorder.
- Guy de Bievre (B) works with both the **electric guitar** and a variety of custom-made devices and **electronic circuits** to create a sound environment that has a degree of autonomy and chance. This is

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an interesting contrast to the explicitly fine level of control aimed for in the other set-ups and uses different software, Audiomulch and Pd.

- The **flute and sound** environment of Yolande Harris (GB/NL) uses a combination of samples and manipulation of flute sounds, controlled by an interface of sensors and **instrumentlets** controlling Max/MSP. The design of individual **graphic and video score** systems are an essential element of the palette.
- The **Video-Organ** of Yolande Harris and Bert Bongers (NL) is a series of instrumentlets that together create a control surface for the live playback and manipulation of video and sound samples (Bongers and Harris 2002). It is expandable, can be linked to a number of screens, and can be played by more than one person. It can also incorporate video streams from more than one **live camera**. This is based on Max/MSP + Jitter. Three video projectors were available. The **Video-Walks** are an extension of this set-up by making the projectors portable and wireless and controllable in real-time.
- Bert Bongers techniques for **Interactivating Spaces** (Bongers 2002) by sensing the movements through the spatial environment expanded the intimate personal scale of the instruments in the group, to a shared scale that could be used to incorporate the audience as well as the players. A variety of sensors were available to try out and place in the space.
- The **sound design** of Jos Mulder (NL) allowed the distribution of the sounds throughout the spaces available to us using multiple speakers. The set-up was basic but flexible to allow for changes in the sound design over the week and included a digital mixing desk to try the dynamic routing of signals from the players. The use of the OSC (Open Sound Control) protocol enabled the distribution of data, and sound and video were streamed over the Meta-Orchestra's **network**.
- The **graphic designers** Sebastian Menendez and Florencia Reina (AR) worked with **photography and mixed media** to visualise various aspects of the environment. They also worked on the **typographic design** of the Meta-Orchestra logo for the website. Unlike the others which are performative and real-time, this work added layers by revealing the processes of working over the course of the week.
- Sebastian Harris (GB/ES) joined the group for the last three days as **architect and set designer**. He worked on the layout of the spaces, the use of mirrors and furniture to direct the **flow and speed** of the audience, and various projection techniques. He also filmed the workshop and final performance as **video documentation**.

The Maastricht Meta-Orchestra had a large variety of audio, visual, temporal and spatial aspects. The technologies brought in by each participant were combined with the general Meta-Orchestra equipment which centres around the network infrastructure, and the basic sound system and video projectors. The 'palette' included:

- instrumental acoustic sound
- electronic sound
- live video
- camera performance
- mobile projection techniques
- sound diffusion techniques
- physical sensor space
- spatial distribution and layering in time
- use of a wireless network for data image and sound
- visualisations of activity by montage, photographic and printed material
- set design and spatial layout
- documentation by video.

5. THE NATURE OF THE MULTI-DISCIPLINARY FIELD

If elements as broad as space, time and energy can be considered as the now established materials of multi-disciplinary artists (in the broadest sense), the finer detail elements risk becoming submerged. It is no longer a matter of pitch-rhythm-timbre or colour-form-texture relationships (to name a few) but on the larger scale level of sound-image-space and techno-human-natural relations. The 'purity' of discourse within the individual arts is 'diluted' to cover broader, less precise materials.

Below are some basic observations of late twentieth century developments that make multi-disciplinary collaborations difficult from the onset. Firstly, the traditional artistic roles, for example in music, of composer, performer, improviser, conductor, audience, instrument builder, have all shifted and do not make a suitable basis for approaching collaborative or multidisciplinary art (Harris and Bongers 2002). Secondly, as pointed out by Trevor Wishart, the complexity of 'endless possibilities' faces an artist using computer technologies, and a general approach of experimentation rather than perfection is the only real solution (Wishart 1994). A vast majority of the music and visual arts worlds have not taken up the challenge of using computer technology and are not familiar with possibilities and problems raised by it, making collaborations outside the world of 'the new media' very difficult. Within the world of new media itself there are approaches that are equally incompatible, for example those that like to mystify and those who try to clarify the technological process in their way of creating art.

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One way to achieve the required openness of exchange between media, given the complexity and unpredictability of the materials being worked with, is to create an experimental workshop environment that creates through trial and error. Work in such a collaborative environment would need to encourage the experimental values of improvisation and play with a freedom from rigid concept and formula. A feature of a multi-disciplinary work is its openness, its extensiveness and its reliance on experiment. The question that needs to be asked is how do we structure such a venture without contradicting its experimental nature?

6. THREE LEVELS: THE SOCIAL, THE TECHNICAL AND THE AESTHETIC

One very open way to approach the problem is to consider development on three overlapping levels that can be applied to the complex problems raised in the discussion of the Meta-Orchestra. Firstly, on the **social** level, by exchanging different working patterns and practices it may be possible to broaden the base for collaboration. This level includes discussions of roles in collaborative work, the most suitable group structure for a particular project, and the assessment of common grounds (see section 7). Secondly, on the **technical** level, to continually discover and create new technical possibilities from which to develop tools to enrich and update the palette. In the projects described here this includes the development of software and hardware for new instruments, the use of the network and its wireless capabilities, and the techniques of remote video and sound (this is discussed in more detail in section 9). Thirdly, on the **aesthetic** level, to develop a more thorough understanding of the nature of combining image, sound, movement and space. This level includes establishing a basis for compositional choices, the role of a central communicative device like the score, and experimenting with layering sounds, images, spaces and their times. It also implies an assessment of the previous two levels (see sections 8 and 10).

7. STRATEGIES TO IDENTIFY COMMON GROUNDS AND DIFFERENCES

Given the diversity of expertises and working practices in the group, common grounds needed to be identified early on in the research process. Various attempts were made to bridge these differences as described below. Every idea proposed at the beginning of the week was tried, discarded or developed. Ideas were tested individually and in small groups, often with many layers happening simultaneously. There was deliberately no explicit hierarchy in the attempt to establish a functional informal group structure for the research.

A reading table was made in the centre of the space where every member of the orchestra contributed books, CDs, videos and articles that they considered relevant, including examples of their own work. This collection of information encouraged openness to both the different disciplines and the individual backgrounds of the members. It also had the benefit of showing the diversity of interests and influences to visitors, and so was displayed for reference as part of the final presentation.

One tool to foster collaboration and communication between the group members was the use of large sheets of paper available on the reading table for anyone to draw or write on. The graphic designers created a situation where the contributions of people on one physical sheet gave a collaborative overview and focal point. The visualisations of the musicians revealed their working processes and it visualised the spatial links of the network, the architectural spaces, the layout of the sensors and projectors. Although not complete or 'correct', as a document it reveals the dynamics of the group (see figures 1, 2 and 3).

Video was recorded and played back in the same space whilst working, layering images of the previous day's work into the space. The idea to attach projectors to individuals' computers was to open up the private work, the methods and techniques of working in certain programmes, with sound, or video, or design, to the rest of the group. In reality this was not always taken up, perhaps revealing an innate private / public boundary in the working practices of the members. The score (described later), which showed both the network activity and live video, was projected continuously and worked on 'in public'. This then came some way to 'bringing out' the workings of the group and creating a common focus.

Two common grounds can be identified in broad terms. Firstly, each member had expertise and experience with the computer technology used, both hardware and software. The possibility of linking each individual computer set-up together via a high-speed network created an area of common focus regardless of the dominant discipline. Secondly, the uses of and movements through the spatial locations (described later) created a common physical layer. These two features provided the underlying structure for the final presentation. There was more specific expertise common to the group such as: the programming environment Max/MSP+Jitter in combination with an Apple computer; the working expectations of creating a performance; improvisation skills; the possibility of offering changing parameters (sensor data) for sharing data over the network.

8. TWO NEW OPPOSING ROLES FOR THE SCORE

The issue of creating a score for the Meta-Orchestra is often discussed. Given the variety of the group,

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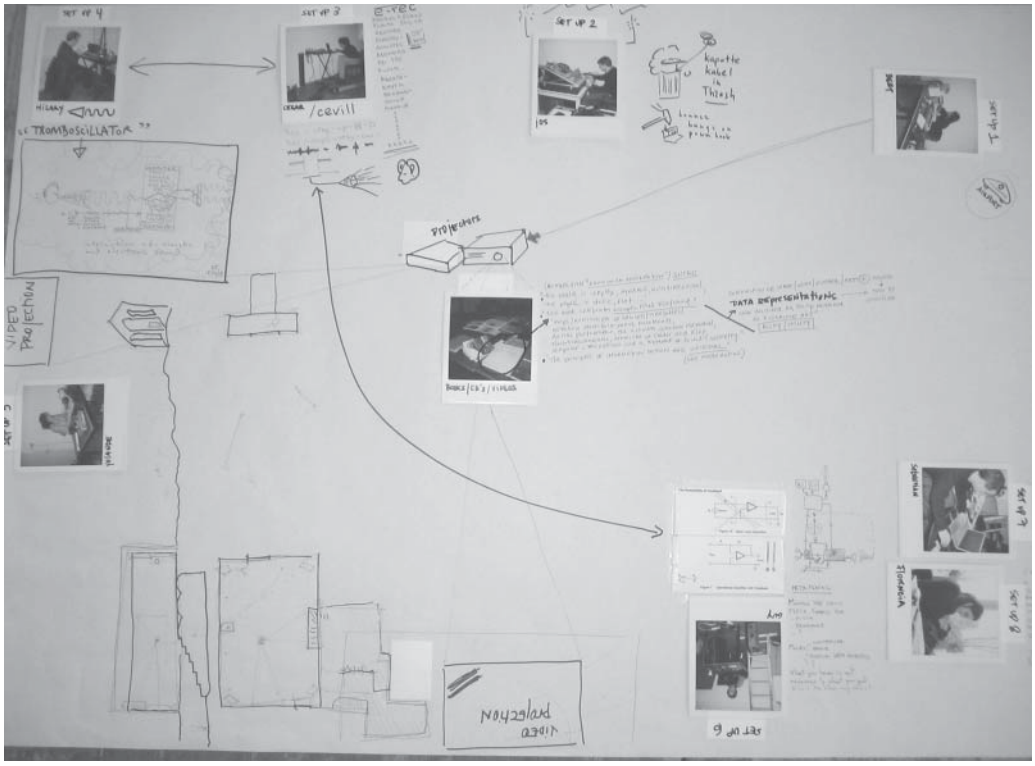


Figure 1. Meta-Orchestra communal drawing sheet 1.

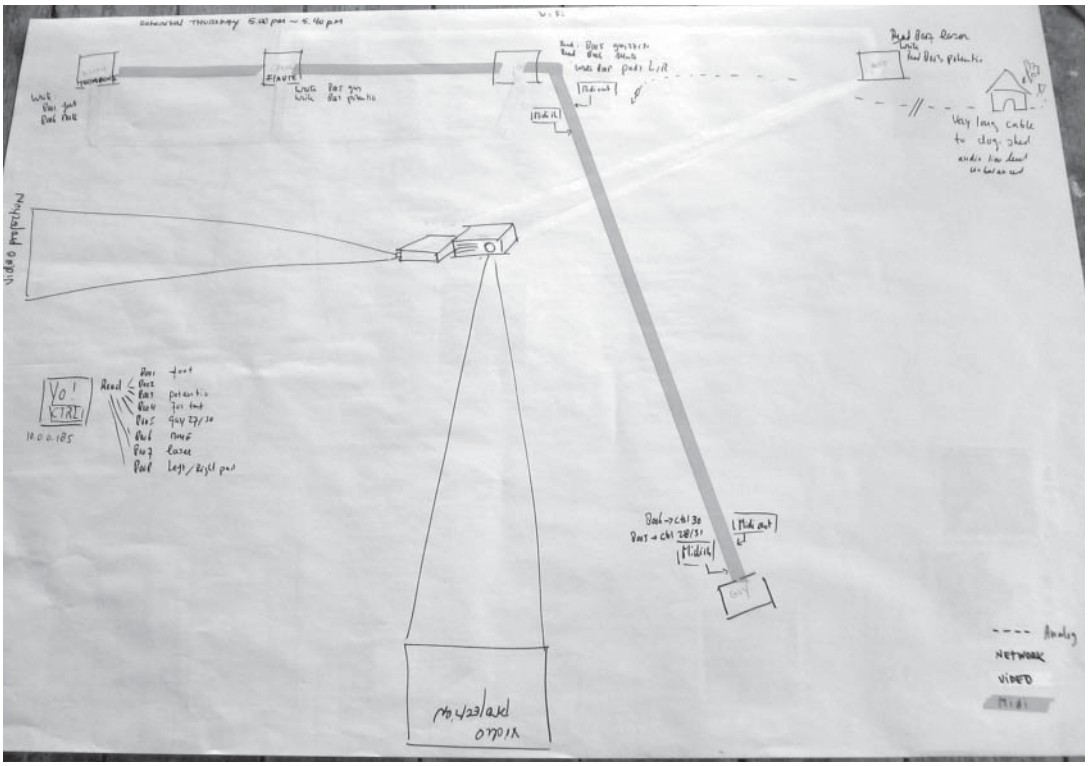


Figure 2. Meta-Orchestra communal drawing sheet 2.

socially, technically and aesthetically, it is clear that a traditional score would have little relevance. The Score Spaces research project, initiated by the author at the Jan van Eyck Academie, of which the Meta-Orchestra project was a part, assesses the transformation of the musical score from graphic, to moving, to

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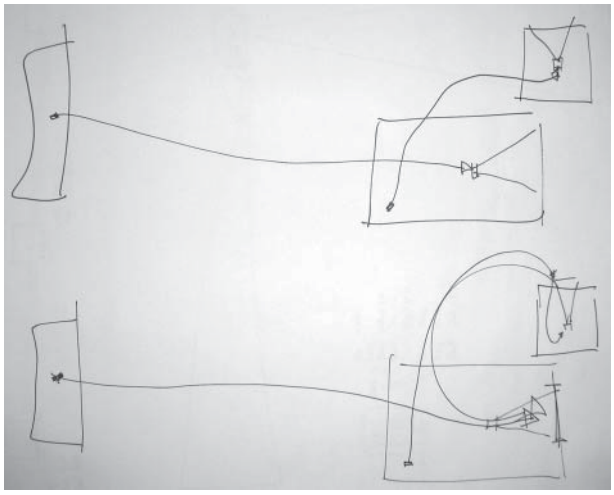


Figure 3. Plan sketches of linking spaces.

audio-visual, to spatial. Besides the traditional musical score and the conventions of western notation, still used successfully in composition today, the concept of a score has greatly evolved in multi-disciplinary work, and its new roles need to be emphasised.

Music is an audible time-based art but the notations that communicate its essence are visual and spatial. The musical score crosses the old boundaries of artistic disciplines as defined by our human senses by relying on a visual code to convey an audible result. Sound is transformed into visual form and re-interpreted into sound, leaving a *gap* for interpretation, or misinterpretation as it crosses our perceptual and cognitive systems. Yet, since its development in the Mediaeval period, the transcribing of sound into visual code has shaped a musical complexity that would have been impossible to achieve by memory alone. This writing down of music has also lead to a reliance on text and the 'absolute truth' of the written score, where the score *is* the music. The *gap* was exploited in the 1960s as a way to free music and musicians from the confining nature of traditional western notation. The explosion of new, often unique experiments with musical notations by composers as diverse as Cage, Stockhausen, Xenakis, Cardew or Braxton, marked a shift in attitude towards the role of musical signs and their meanings in performance. At the same time the Fluxus performers were experimenting with notations of time-based spatial events. Re-thinking the musical score could become a way to structure new group relations between performers and artists of different disciplines in a technologically extended environment.

This goes hand in hand with a blurring of the roles of performer, composer and improviser. Once the music is not fixed and notated in detail but is outlined by an open structure, the authorship of a piece is no longer clearly defined. It becomes a collaboration between performer and composer, who may often be the same person. The exact sonic repeatability of a work is also no longer relevant in such an open work as, for example, Cornelius Cardew's entirely graphic score *Treatise*. Exact authorship and repeatability is more achievable in electronic music than in the interpretation of a score, as the communication between players is not an issue. However, in live electronic music and multi-disciplinary art in general, the influence of technology on musical practice significantly expands the idea of a score. The need to visualise the changes in performance information as it develops throughout the piece can only be displayed in an updatable, dynamic and flexible score.

However, the strict visualisation of data does not have the breadth and openness of a score as the *gap* (described above) of interpretation and therefore communication is closed. It becomes a precise numerical translation from one medium to another, very useful for the analysis of complex data structures that need to be revealed via another sense, but acting as a duplication of information in a performance environment. The data approach to combining disciplines is common in HCI (Human Computer Interaction), music and gesture research, as it offers a conceptually rational link between image and sound (see, for example, much of the work presented in the recent European Project, Gestural Control of Audio Systems (ConGAS 2004)). The treatment of sound and image as translatable numerical data has arisen out of computer technology, but our ability to create meaning in images and sounds is not restricted to our perception of its comparative inner data structure. Film theorist Michel Chion names the 'audio-visual contract' which shows how an image and a sound played simultaneously changes our understanding of the meaning of both (Chion 1994). This is another example of the gap of interpretation described above and the alchemy described below under 'chemical reactions'.

A brief look at the role of the musical score reveals two fundamentally different perspectives in audio-visual work. One is the direct translation between sonic and visual forms via their treatment as abstract numeric data, and the other as an associative layering of contrasting sounds and images to create new meanings. This power to create new meanings through the combinations of image and sound can also be extended by the interaction with the space it is placed in. If we see the score as an open multidisciplinary environment that provides an underlying structure that is updatable and spatial, we can understand that the score has evolved, to be not pre-scribed but to situate itself in the here and now, the present, as a spatial interface in the performance (Harris 2002). Initial experiments to make a score system for the Meta-Orchestra are described in the following section.

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9. FOUR ELEMENTS

So far this paper has described the history and aims of the Meta-Orchestra, presented the diversity of the group and palette, and discussed corresponding issues of the orchestra, the score and the multidisciplinary field in general. The following four elements describe the most significant aspects particular to the Maastricht meeting, introducing the ways in which the spaces, the network, the mapping and the score were treated. In a later section it will become clear how these elements shaped the outcome of the final presentation.

9.1. The space

The space provides the technical infrastructure for the workshop and shapes the aesthetic decisions. The orchestra was given the use of one rectangular space of about one hundred square metres, the annex of a large town house now functioning as the contemporary art centre of Maastricht. This was the focal point of the work where the main sound system, projectors and all the individual set-ups were situated and where the research and performance took place. This was extended by the discovery of an extensive vaulted basement area with a separate entrance and a large trap door leading into the main space. The main space led onto a large walled garden area and a garden house with its own vaulted basement at a distance of about eighty metres. All these spaces were used in the final performance, as described later, and as can be seen in the video excerpt.

9.2. The network

The network infrastructure of the orchestra, comprised of a partly wireless LAN (Local Area Network), enabled both fixed and mobile points. Some set-ups in the main workshop space were connected with the colour-coded Meta-Orchestra green ethernet cables, via a central hub (Fast Ethernet Switch), located by the mixing desk. A wireless network was set up with two base-stations linked together, one placed in the main space, the second in the garden house. This created a wireless network coverage over the whole area.

Experiments were made to test streaming video and sound from a remote location over the network to other spaces. Creating a portable set out of a FireWire Camera and Powerbook, images and sounds from different spaces were relayed back to the central space, where they were displayed in the score and over the sound system. The mobility of the set-up enabled the remote camera to walk and explore the building and garden (see figures 4 and 5). The Airport Extreme WiFi base station and the iSight FireWire Camera were used for ease of configuration and therefore to save time. It was not intended to limit the technology to off-the-shelf parts, however it provided a solid, efficient base for the experiments.



Figure 4. Wireless mobile camera set-up showing computer, wireless station and camera.



Figure 5. Walking in the garden, streaming images from the camera.

Part of the sound system was set up in the garden house and the basements via long analogue cables reaching from the main space, providing another layer of placing sounds in remote locations. The video projectors were also movable and were set up in various spaces as well as being used wirelessly in the video walks.

9.3. The mapping

As the graphical programming language Max/MSP was common to (nearly) everyone in the group, the building of the basic network was relatively straightforward. Using the OSC (OpenSoundControl) protocol for distributing data over a network, several connecting paths were made between players with the

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information being displayed directly in Max/MSP on the main score screen. Each player could make available on the network a few of their performance parameters (sensor data from their instruments), as well as accept input for external control of some parameters of their processes (sounds and images). In this way the mapping between one player's gesture and another's effect became clear. For example, the dynamic of the breath controller in the Eraser-Recorder was directly linked to the mix controlling one video channel of the Video-Organ. Although cause and effect relationships are easy to recognise, it is often discussed that they quickly become predictable and boring. The use of one parameter from each player avoided this by addressing one layer in a much denser sound and image environment. This simultaneous multi-layered approach gave a density more like counterpoint. A number of these experiments developed into features of the final performance.

9.4. The score

The role of the network within the communicative layers already in place in the performing group needed to be examined in more detail. Considering that the network was one layer in the palette, it was important to assess its relevance and its degree of visibility in general. The invisibility of dense streams of data causes complexity for both the user of the technology and the audience. A useful score system could visualise this layer as a way of revealing the continuous exchanges of data within the Meta-Orchestra during the performance.

A simple score, also programmed in Max, was developed to visualise the overall network activity of the group. This consisted of a series of interlinked colour-coded sliders spatially configured to represent the layout of players in the physical space. The information displayed was kept to a minimum so that the network activity could be clearly visible.

Specific links were made between the different players when they decided they had something suitable to share. Various precise couplings were practised between the performers, represented by a slider sending data out and a slider receiving the change in data. This shared data then, would appear on both sliders simultaneously, making clear which shared network lines were active. As each slider represents a parameter, it can be seen that two or three parameters were used by each player. As network activity was not the only form of communication or musical activity within the group, this quantity was dense enough.

The central part of the score was taken up by the video images from the two live cameras. One was connected directly to the computer displaying the score and so was always filming the activity in the central space. The other camera streamed images over the network (and therefore had a lower frame rate and a time-lag) and could display images by moving through remote spaces. Although basic, the score proved to be very useful in revealing the spatial, image and data activity (see figure 6).

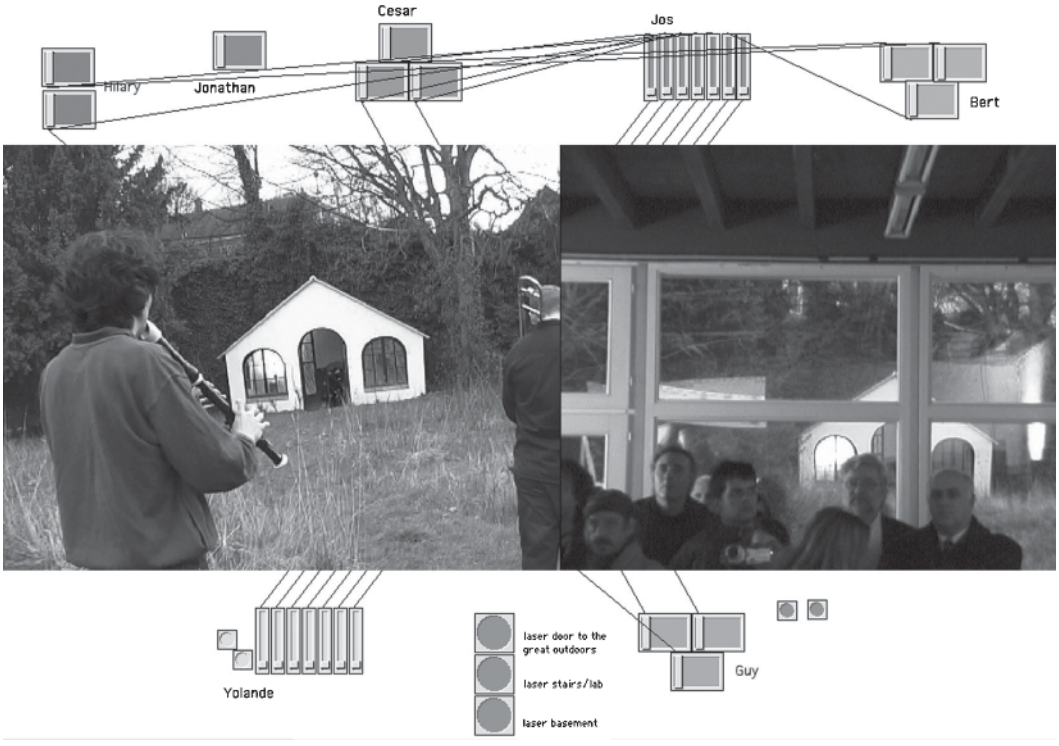


Figure 6. Meta-Orchestra Score Showing network activity between players and live camera images.

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10. CHEMICAL REACTIONS / AESTHETIC EXPERIMENTS

Trevor Wishart paints the picture of a sonic artist no longer as an architect but as a chemist, or even an alchemist, pulling sounds apart and reshaping them from the inside to produce something entirely new (Wishart 1994). To what extent this is possible outside of the realm of sounds, or rather between the realms of sounds and images in spaces, is the question here. The analogy of the chemist could be useful to describe the experimental results of combining image, sounds and movements, in the moment of a chemical reaction. Below are three illustrations of practical explorations into sonic / visual / spatial alchemy, which form a relevant background to the aesthetic issues faced by the Meta-Orchestra.

Much recent work combining improvising musicians with video artists uses this sound – moving image juxtaposition in performance to create unexpected moments of synthesis and meaning. It is fascinating to experience the changes of meaning or atmosphere created by the musicians layering sounds on the video images and *vice versa*. These moments of interest are usually arbitrary and beyond the ability of each player to determine, particularly as many musicians will not look at the image at all and many video artists project the image behind the musicians. Although it is this form of practical experiment that is helping to build a valuable body of experience between visual and sonic worlds, the potentials of combining the sound and video are not explored to the full.

The Video-Walks of the last two years have experimented with taking images and sounds for a walk through diverse spaces such as a forest, an empty beach, a disused gallery space (Yolande Harris and Bert Bongers). Extending Paul Klee's famous gesture of taking a line for a walk, the Video-Walks literally take the images and sound walking through space. Walking with a projector in an unlit space confuses its function as it oscillates between a torch and a projector. In the moment that it reveals the path or the object it shines on, its own projected image is thrown out onto it. The projected image itself encounters rapid changes in scale, and often disintegrates into light patterns depending on the surface and angle of reflected light. Some combinations of the real physical world and the projected virtual images are indeed like chemical reactions, sometimes spectacular in their transformations and other times un-reactive and inert. In the 2003 performance, *Between: Two, Duet for Mobile Video Players*, two portable set-ups were carried through a large disused indoor space. The two players moved through this space, somewhat like explorers, carrying the sound source on their backs, with the audience free to move around. The mobility of the sounds and images, the performers and the audience, extended the space beyond its previous uses.

The combination of the exploring mobility of audience and performers, sounds and images, with the stationary, formed a basis for the final presentation of the Meta-Orchestra project.

11. A DESCRIPTION OF THE FINAL PRESENTATION

The Maastricht meeting laid most emphasis on the research during the week rather than the final performance. The aim was to find a performative way to present the research results to an audience at the end of the week. Striking a balance between research and performance then was critical. The performance itself acted as a way to pull together the disparate research of the week into a whole, and gave an important impulse to conclude the work.

In the publicity announcement the audience were invited to visit the lab/workshop where the Meta-Orchestra had been working during the week. Whilst the orchestra played, the audience could move through and explore the different spaces. This was focused around the main space to which the remote video was relaying images, where the general score was displayed and where most of the performers were situated. The introduction started with the audience in the main space watching a live broadcast from an attic room in the building. Three musicians, at this stage playing acoustic instruments, were collected from different spaces in the house by the live camera player, forming a procession out of the house, through the garden, now also in direct view of the audience in the main space, to the building at the back where the trumpeter was to be found. The procession turned back, walked down the garden path, were spontaneously joined by the audience, and continued in the main space where the electronic sounds were brought in. At this stage in the evening it was still daylight.

The audience were then prepared for a 'scene change' and taken into the basement via another entrance. A laser beam and light sensor across the stairs into the basement relayed the fact of every passing person to the performers in the main space via the score. A video projection in one vaulted cellar space relayed images from the video organ dissolved with the live camera images of the performance space, whilst the sounds carried through the building introducing the activity in the distant space. The audience then found their way through another cellar room where the reading material, the sheets of drawings, the designers' prints and photographs, and an animation were placed. The layout of the cellar was shaped by the architect with an aim to direct the flow of the audience via visual attention by the use of mirrors, table layout and furniture, and lighting, encouraging them to linger at their own speed. The sounds drew the audience up into the space, in their own time, via a trap-door in the

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floor. The experience of entering the performance or stage from below, with the musicians now playing their electronically extended instruments and two image projections, gave the sensation of reaching another space, or re-entering from a different perspective.

The performance in the main space, constituting the central part of the evening, consisted of a *tutti* of musicians, video-organ and live camera. The network relationships between players was used and revealed on the central score. The two live cameras continued to layer the spaces by relaying the same space from different viewpoints into the score. The audience gradually emerged from the basement section, each time passing the second laser sensor, which, relayed to the score and visible to all, provided visual feedback of their actions. The space was small enough to allow the audience and performers to be in close proximity.

As it grew dark outside, the Video Walk set-up was prepared and the duo of projector and live camera left the main space into the garden. The musicians again took up their acoustic instruments and processed out following the video. The projector and camera entered the garden house, projecting on everything including out through the windows and continually relaying the images from the camera back to the main space. The audience could watch the exploration by moving out into the garden or staying in the space. The third laser sensor was placed on the garden door. The musicians fell silent leaving the dusk, the singing birds, and the moving images which distort to become colours, lights and abstract figures.

The presentation is summarised in a short video documentation on the CD included with this issue of *Organised Sound*.

12. REFLECTIONS AND FUTURE PLANS

The multiple layers that made up this presentation were very dense and required a lot of attention. Given this complexity it was necessary to utilise specialist skills, such as improvisation, in order to keep the flow and hold the performance together. There was a conscious attempt to include the audience in the processes and to communicate some of the excitement of this dense layering. The projected score functioned as a pivotal focal point for all and came some way to presenting the multiple layers of images, sounds, spaces, performers and data.

There are several ways to continue this work. The research project tested a number of possible new techniques for both the individuals and the group. The performance, although informal, brought together what could be the basis for a more expanded performance. Alternatively, the research could be taken to form the basis of workshop teaching. The ideals of the original Meta-Orchestra, the nature of the changing group and different instantiations of the project, would be challenged by the creation of a travelling repeatable performance. Similarly, to limit the development to workshops and teaching would not make the most of the potential for performances which would be an obvious aim of such a group.

There have been a number of suggestions from the Meta members themselves, sparked by the Maastricht meeting. There is certainly a strong feeling for continuing to focus more strongly on developing a performance practice particular to the group. The suggestions include the greater involvement of dance, set design and visualisations working towards a fuller performance practice. Another describes the folding of previous performances into each new one, which would keep the continuity and build a base to work from. Clearly, the next meeting will have different influences, people and aims focused to the latest problems. It is crucial to maintain this flexibility.

The Meta-Orchestra has often discussed the issues of how to create a composition for the group without contradicting its experimental nature. To ask a composer to write for the Meta-Orchestra would bring in aesthetic systems from outside the research created by the group. Likewise a traditional score may fix and prescribe actions and performative results which would be against the nature of the evolving research. It seems clearer for the composer, as an orchestra member, to fill a more neutral role as that of an umpire, overseeing how each member creatively constructs meaning from their position, into the whole. The score then lies more in the realm of visualisation of layers of diverse activity, allowing multiple interactions and acting as a communication medium between players and audience.

13. CONCLUSIONS

This paper has laid out an overview of issues related to experimental group environments in multidisciplinary arts practice and theory. The complexity of layers, brought up by the work described, could only have been discovered by this critically experimental approach to research. The working process is ideal for an early stage in the research, as a method for discovering new directions in an unwritten, unexplored territory. Whether this results in a performance, or a theoretical piece, or a teaching method, is in many senses unimportant. The experimental approach could even be considered a goal in itself.

Issues of combinations of disciplines and relations to audience mentioned in the early part of the paper run throughout such a project, providing a baseline for discussion. The Meta-Orchestra itself proved to be a very successful approach to practical research and has provided fuel for thought and future experiment in many directions. This indicates the validity of addressing theory through practice and *vice versa*.

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