The certainty of chance and a new noise:

A pan-idiomatic approach that explores the boundaries of composition, improvisation and creative technology

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Abstract

This thesis, which is made up of both practical compositional work and a commentary, proposes a new relationship between composition, notation, improvised music, and technology. This thesis proposes ways in which technology can facilitate new approaches to the integration of composition, notation and improvisation.

This thesis considers how our understanding of, and relationship to, composition and improvisation change when new technologies are used in performance settings. The thesis also suggests how contemporary practitioners can employ technologies practically to create new methodologies that challenge older, more established, paradigms. This thesis also suggests practical ways in which technology can be employed to challenge and extend traditional concepts of notation, form and genre.

As well as proposing and examining practical issues, this thesis develops a new conceptual framework within the commentary, to help discuss the practice-based discoveries of the project.

For my family

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Glossary

Here is a definition of key terms that are used throughout the commentary. Throughout the commentary at points where further clarification is necessary the term in question will have been footnoted. It is hoped that this will allow the specific usage of each term to be clearer.

Composition: the organisation of sound in time, in some way. This organisation can be rigours or not. There will be some musical factors (melodic, sonic, harmonic, rhythmic…) which allow the organised sounds to be recognizable as the same work. A listener could hear two performances or recordings of the same work and identify the work as the same piece.

Digitisation: the conversion of changing the analogue to the digital.
In this context the conversion of paper scores into digital representations that could be manipulated in real time, through the use of the *DreamSampler*.

Freedom: refers to musical freedom. This is defined loosely as the freedom to play what is requested or not, the freedom to conform to an idiomatic expectation or not, the freedom not to play.

Inderminacy: the quality of being uncertain or vague, or an understanding of process drawn from Cage (1973), which situates chance at the point of composition, after which the process of composition becomes fixed. See Bailey (1992 p. 84) for a detailed overview of indeterminate compositional practice.

Improvisation: this is dealt with at some length in the literature review (chapter two). In short, this research discusses improvisation within the jazz idiom (including free jazz), free improvisation and pan-idiomatic improvisation.[1]

Mediation: for the purposes of this research is defined as the intervention in a dispute, or set of differences, in order to resolve it/them.

Notation: within this research means the representation of sound visually, so that a performer can interpret that visual representation. This definition includes standard notation (notes on a page), graphic notation and animated notation or a combination of these.

Schema: shape, or more generally, plan. As a descriptor and adjunct to notation. As in, schema of improvisation and/or performance. For example, there is a musical form, but how that form is filled in is decided by performers during performance.

Sound-world

1) The combined sonic elements of a recording or performance, perhaps an unintentional by-product of place, recording technology, performers, instrumentation and musical material.
2) The excepted tonal palette and instrumentation of an idiom: this presupposes an excepted way of recording and producing sound within the given idiom.

[1] For further insight in this area please see chapter two. Both Bailey (1992) and Toop (2018) are also useful here for extended reading/explanation.

Technology: within the confines of this research is used when discussing specific technologies relating to recorded sound, a collection of digital technologies, and to a lesser extent, technologies used in sound production by performers during performance.

1) Various digital scoring technologies deployed in animated graphic scores and real-time notation.
2) Various electronic and technological manipulation of sound at both the performance and recording levels.

Throughout the commentary at points which need clarity, footnotes are used to define each utterance of the word technology.

Ontological

1) Relating to the branch of metaphysics dealing with the nature of being.
2) Showing the relations between the concepts and categories in a subject area or domain.

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Chapter 1: Introduction

This thesis is concerned with the relationship between composition, notation improvised music, and technology. The thesis asks if technology can facilitate new approaches to the integration of composition, notation and improvisation. This commentary considers what the theoretical implications of a specific set of practical technological deployments might be. The following chapter outlines the questions and aims of the project as well as laying out the conceptual framework that underpins the work. This research is concerned with considering the following research questions:

1) How does our understanding of, and relationship to, composition and improvisation change when new technologies are used in performance settings?

2) In what ways can twenty-first century practitioners employ technologies to create new methodologies that challenge older, more established, paradigms?

3) How can technologies be employed to challenge and extend traditional concepts of notation, form and genre?

The aim of this research is to attempt to answer the above questions using both practical and conceptual approaches, as well as making reference to, and building upon, existing literature and work in this and related areas. It is intended that the practical outputs of the research and commentary point to a set of possible ways to answer the above questions.

The principal output of this research is the extended piece *Dreams of a Delinquent King* (henceforth referred to as *DDK*) for electric guitar, drums, hardware electronics, laptop, basses, piano, electric piano and synths. This commentary charts the development of both the compositional and technological framework necessary for the piece's realization. This technological framework is referred to as the *DreamSampler.*[2] Submitted alongside the main piece *DDK,* are a set of preparatory pieces which support the main composition, both compositionally and conceptually. This commentary discusses the compositional process and related performance practices of *DDK* and the preparatory pieces. It also discusses the development of the technological underpinning of *DDK* (the *DreamSampler*) as well as considering other technologically related issues.[3] Furthermore, this commentary proposes a conceptual framework with which to begin to discuss some of the implications of the practical work. It is intended that the proposed conceptual framework helps with attempts to answer the research questions.

This submission is made up of a mixture of recordings, videos, scores and commentary.[4] A USB stick is included as part of the submission; this provides all the necessary data and information. Further scores and sketches are provided as hard copies.
The file system of the submitted USB stick is provided here (all folders are in bold):

[2] The *DreamSampler* allows the projection and manipulation of a real-time score, encapsulating one of the key definitions of what this commentary refers to as technology. The *Dreamsampler* is discussed at length in chapter five.

[3] This includes discussion of the practical deployment of specific digital technologies, which are used to both develop and operate *DreamSampler*, as well as discussions around specific digital technologies which influence the sonic aspect of the piece, including but not limited to outboard fx set-ups and specific computer programs for the processing and manipulation of sound during performance.

[4] These can, in their own ways, can be seen as technological.

1) **Dreams of a Delinquent King**: This contains the main output of the research which is composed of versions of the piece *Dreams of a Delinquent King*.

Audio: Contains an audio recording of the piece *Dreams of a Delinquent King.*

Video: Contains two audio-visual versions of the piece: *DDK master (score)* and *DDK (with in-studio footage)*.

The audio-visual *DDK master (score)* is literally the score of the piece: this is the video output from a laptop and constitutes the real-time score that the musicians were performing from. *DDK (with in-studio footage)* is the same audio-visual version with in-studio footage edited in. It is intended that this will provide context to the performance practice deployed in the realisation of the piece.[5]

2) **Other Dreams**: This contains unfinished sections of the larger work *Dreams of a Delinquent King*.

Audio: Audio recordings of *Dream One* (*Take Two*); *Dream Two* (*Take Two*); *Dream Two* (*Take Three*) and *Dream Three*.

Video: audio-visual versions/recordings of *Dream One* (*Take Two*); *Dream Two* (*Take Two*); *Dream Two* (*Take Three*) and *Dream Three*.

As with *DDK,* the video of these pieces is also the score: videos are the output from a laptop that constitutes the real-time score that the musicians were performing from.

3) **Preparatory Pieces**: [6] This contains recordings of all the preparatory pieces written/performed in support of this research.

[5] The compositional construction of the piece, the technological development of the *DreamSampler* (the technological interface used to realise the piece, and the performance practices needed for the realisation of *DDK* are discussed in chapters four, five and six in detail).

[6] These are discussed at length in chapter three.

Establishing a Compositional Toolkit: Includes the pieces *Taps* (Three versions: Piano quintet, piano trio and jazz quartet); *Arches*; *Bean (Decibel)*; *Algernon and Solstice*; *Conduction No.7*; *Curves* (version for string quartet); *No.2; Line Pieces no. 1-6*; Slide *Pieces no. 1-5*; *The Last Few Days*; *Personal Growth; Forrest* (Three versions: Piano trio, solo piano, and string quartet); *Today, Today…; Henry Foxwood Goes To Town.*

Towards a Sound-world: Includes the pieces *Tape Loop* 1; *Lost People*; *Bean* (Memorymoog version); *Curves Bells* (Memorymoog version); *Curves Strings* (Memorymoog version); *Curves* (combined version); *No.3*; *No.4*; *No.5*; *The Black Whole*.

4) **Scores**: Contains digitised versions of all the submitted scores.[7] All scores found here are also submitted as hard copies.

Preparatory Pieces:[8] This contains the following scores *Arches*, *Bean, Conduction Rules, Curves*, *Long Note Pieces*, *Lost People*, *No.2*, *No.3*, *Personal Growth*, *Sliding Textures*, *Tape Loop 1*, *Taps, The Forrest*, *The Last Few Days.*

Delinquent King Fragments: This contains the sketch scores and other related fragments for the pieces *Ides* (*Dream five*) and *Lady M* (*Dream Six*).[9] It also contains sketches and fragments for the pieces *Dream One* and *Dream Two*. These pieces became integrated into the large piece *Dreams of a Delinquent King.*[10]

[7] Written scores were not used in the composition process for all the submitted pieces. In the case of *DDK* and the *Other Dreams* the submitted video is the score.

[8] Discussed in detail in chapter three.

[9] Although I refer to these pieces as *Ides* and *Lady M*, when they are integrated into the larger framework of DDK, they can be considered to be *Dream Five* and *Dream Six* respectively. Therefore, these alternative names appear in brackets next to their working titles.

[10] See chapters four, five and six.

5) **Commentary**: This contains a copy of this document. Additionally, this has been submitted as a hard copy.

6) **Appendices/Background**: This contains three folders which all contribute context to the project.

DreamSampler Sketches:[11] This contains various sketches and diagrams which show the development of the *DreamSampler*.

Images/Clips/Moods for Lawrence Watson: This contains the imagery that was shared with animator Lawrence Watson. Part of the early development of *Dream Three* and *Dream Four*.[12]

Photos and raw footage of DDK recording: This contains photographs and raw video footage taken during the recording process. It is intended that this will provide some extra context to the recording process and attendant performance practices.

It seems prudent at this point to suggest engagement with the practical work before going any further in this commentary. Particular reference should be paid to the materials found in the **Dreams of a Delinquent King** folder. After listening and viewing the materials in the **Dreams of a Delinquent King** folder, a suggestion would be to investigate the fragments and works in the **Other Dreams** folder. The fragments and works in this folder are intended to provide greater context to the main work. The contents of the **Preparatory Pieces** folder should also provide further context to the main work but can be engaged concurrently with this commentary. The reason for this disclaimer is that it may be illuminating to both listen

[11] See chapter five.

[12] See chapter four, section 4f.

to, and view, the work before this commentary can influence any perceptions. A comparison of the readers' perceptions of the work both before and after reading the commentary may be enlightening.

This research is primarily concerned with exploring new ways that specific technologies[13] can build a bridge between the worlds of pan-idiomatic improvisation,[14] notated and non-notated music. The project seeks to build a platform where the fluidity and spontaneity of improvisation can be maintained alongside the rigour of compositional practice. This research asks if technology might contain ways in which the orthodoxies of the above traditions can be challenged, extended and integrated into something new. The project includes a large-scale composition that explores the myriad links and approaches to (and between) improvisation and composition in twentieth and twenty-first century music. The research explores and draws upon the work of many composers and improvisers from both the classical and jazz traditions.[15] The work also incorporates developments in digital media and popular music. The practical questions raised and the practical answers, which were sought in these areas, are central to the research.

[13] This refers to the *DreamSampler*, the sonic manipulation tools (Fx, Laptops, specific programs and synths) that performers used during performance of both *DDK* and some of the Preparatory Pieces. As well as the specific technologies used in the recording and production of all the works in the portfolio.

[14] This term has multiple originators, but a good definition is as follows: the pan-idiomatic has its ideology rooted in diversity and difference. It's no particular secret that, say, Eugene Chadbourne's playing is explicitly idiomatic, or that John Zorn's music is a snap shot of his record collection. Their music is, to some extent, a celebration of personal and social histories rather than the denial of it. Though the term 'pan-idiomatic' may be relatively novel, the ideas embedded in it can also be found in the rhetoric and work of, for instance, members of the AACM. It could be considered that when Ishmael Wadada Leo Smith talks about 'creative contemporary world music,' he's aware of difference and diversity and embracing personal and social histories (Improvising Guitar, 2006). Stewart (2007) is also useful here.

[15] Please see chapter two for a more comprehensive overview of this area.

As stated earlier, the principal output of this research is the extended piece *DDK* and the development of both the compositional and technological framework necessary for the piece's realization: the *DreamSampler*. As listed above there are several versions of *DDK* in this submission: The audio version *Dreams of a Delinquent King* and two audio-visual versions *DDK master (score)* and *DDK (with in studio footage).* Both the audio version and audio-visual versions are key parts of this submission and should be given equal consideration. Submitted alongside the versions of the main piece *DDK,* there are a set of preparatory pieces which support the main composition, both compositionally and conceptually. As noted above, these preparatory pieces are divided into two subsections.

The first, Establishing a Compositional Tool-Kit, is a set of pieces that are predominantly acoustic and idiomatic in nature. These pieces can be considered in differing ways to be 'conditionally finished'[16] works. A conditionally finished work is one that can only be completely realised through performance. In some respects, this definition is true of a multitude of different musical compositions. What is unique about conditionally finished pieces is that they have a certain potentiality built into them at a compositional level, that is, there are designed elements within the pieces that can only be completed by the performers during performance. One need only consider indeterminate, aleatoric and improvised works: the composer deliberately shares compositional responsibility, through collaboration, with the performers playing the piece. Conditionally finished pieces have profound implications for performance practice, as each performance of the piece has the potential to be radically different (or not) from any existing or previous performance. This potential for difference is encoded into the conditional work at a compositional level. The

[16] This is my terminology but is related to Rosenboom's (1997) notion of propositional music.

preparatory works, in the Establishing a Compositional Tool-Kit[17] subsection, attempt to suggest some approaches to the construction and practical realisation of deliberately conditional pieces.

The second set of pieces collectively entitled Towards a Sound-World, is concerned with the sonic aspects of sound and how these can be manipulated, [18] pan-idiomatic improvisation and the development of an ontological approach to what we will call the total sound-object. [19] The total sound-object is a development of the notion of the conditionally finished piece. The total, sound-object attempts to extend the remit of the conditionally finished piece to include a multitude of other factors; including situation, technologies, and non-music-based collaborators and collaboration. Both Durkin (2014) and Strachen (2017) are useful here.

The total sound-object is a composition/improvisation/performance that is inseparable from the recording/performance and situation that it is produced within. This situation is explicitly related to the collaboration and relationships, between not only all the people involved in a total sound-object's creation, but also the technology that is used in the production of the total sound-object.[20] The total sound-object is a deliberately designed

[17] The recordings can be found on the USB stick in Preparatory works: Establishing a Compositional Tool-Kit. Some notated scores (where relevant) can be found on the USB stick in Scores: Preparatory Works – hard copies of these scores are also submitted.

[18] For this research, sonic manipulation is tied to the technologies which allow it to happen. Please see chapters three(b), five and six for more specific discussion in this area.

[19] Again, this is my terminology, the total sound-object is given greater consideration and explanation in chapter seven. The concept of the total sound-object has its roots in Schaeffer's conception of the sound-object, the acousmatic experience and the notion of 'reduced listening'. See Schaeffer (1952 and 1966) and Kane (2014) for a more in-depth analysis of Schaeffer's theories.

[20] This point shares certain ideas with actor network theory. Strachan (2017, pp. 15-17) gives an overview of this set of ideas with particular emphasis of the relationship between musicians and digital technologies.

attempt at the point of composition to incorporate all the factors that it encompasses including: the collaborative, performative, technological, compositional and conditional elements. It not only attempts to incorporate these elements but also seeks to balance them.[21]

The notion and consideration of the total sound-object is a central conceptual and theoretical consideration of this research. The total sound-object develops out of, and at the same time underpins, the practical work contained in this project. The notion of the total sound-object encapsulates and provides a possible answer to the research questions that this project seeks to answer. The preparatory works in the Towards a Sound-World[22] subsection suggest some pan-idiomatic approaches to the extension of the conditional finished piece by considering a multitude of other factors including situation, technologies, and both music based and non-music based collaborators and collaboration. These pieces attempt to move towards differing practical realisations of total sound-objects and suggest compositional, technological and performance practice solutions that are implemented in the main work *DDK*.

Both sets of preparatory pieces are underpinned by research into specific composers, improvisers and technologists as outlined in the literature review.[23] This research also significantly builts upon personal experience of improvisatory contexts and certain pitfalls, which are inherent within those contexts. For example, it is all too easy as an improviser to fall back on a set of pre-learnt responses and associated musical techniques when placed

[21] The total sound-object is given further consideration in chapter seven.

[22] The recordings can be found on the USB stick in Preparatory Works: Towards a Sound-world.

[23] Please see chapter two for a more comprehensive overview of this area.

inside a certain performative context. To compose the preparatory pieces, a toolbox of different techniques was assembled via continued musical analysis of specific composers, improvisers, performers and their works. A 'magpie' approach was employed when putting together this toolbox, in that any given technique used by any of the practitioners outlined or indeed any other relevant ones, were included at will. Works were initially written using a combination of these acquired techniques, as well as those already developed during work as a composer and improviser.[24] Through performing, recording and analysing these preparatory works, the compositional techniques were refined and further compositional and performance techniques discovered and developed. Many of the preparatory pieces were arranged and performed in multiple ways. Often, when thinking of a 'classical version' or a 'jazz version', it became clear that it would be necessary to understand, use and integrate multiple compositional and improvisatory approaches.[25]

One positive facet of this dialectical approach was that the different versions of the preparatory pieces allowed different compositional facets to be emphasized. Indeed, in certain compositions it was only through performance that certain facets of the composition came to light at all. This is best illustrated through the comparison of different versions of several compositions: *Forrest*, *Bean* and *Taps*.[26] In each of these pieces, the 'becoming' and conditionality of the work seemed to be of some aesthetic importance. Reflection on the recordings and performances of the preparatory works played an integral role in the development of the piece *DDK*.

[24] See chapter two for a comprehensive overview of this area.

[25] See chapter two for a comprehensive overview of this area.

[26] See chapter three for a comparison and detailed discussion of these pieces.

The literature review, as well as detailing specific investigation into compositional and improvisatory orthodoxies, also examines some extended notational techniques and an exploration of some visual language.[27] The art of painting is initially explored, specifically the paintings of the abstract expressionists.[28] Latterly, the work of digital artists and animators is also explored.[29] As the literature review shows, the exploration of these visual areas leads to an exploration of the still-developing genre of real-time notation. Real-time notation is defined in the literature as 'any digital scoring device that can be altered in real time during performance' (Clay and Freeman, 2010, p. 5).

The main output of this research, the piece *DDK*, emerged from the writing, performing, recording, analysis and consideration of both the preparatory work and a continuous engagement with a body of literature.[30] It was the relationship between the body of literature and the preparatory works that made it clear that *DDK* was going to be an example of real-time notation, using technology[31] to distinctively build a platform where the fluidity and spontaneity of improvisation could be maintained alongside the rigour of compositional practice. Once it was decided that the piece *DDK* was going to be an example of real-time notation, a program needed to be designed and implemented to allow the complete performance of *DDK*. This commentary examines the development of the

[27] See chapter two for a comprehensive overview of this area.

[28] See chapter two, section 2d.

[29] See chapter two, section 2f.

[30] See chapter two.

[31] Here, 'technology' refers to the *DreamSampler*. See chapter 5 for a specific overview and detailing of the technologies deployed in the *DreamSampler*.

that program the *DreamSampler*.[32] The *DreamSampler* is the compositional and technological framework which underpins the piece *DDK*.

1a) *Chapter Overview*

Chapter one is an introduction to the commentary and a general overview of the project. Following on from this, chapter two is a detailed examination of the relevant academic literature which informs the project. Chapter three examines the preparatory pieces in some detail, exploring the compositional, improvisatory, technological and conceptual underpinning for each set of preparatory pieces. The pieces are discussed as types, as a compositional idea is often explored across multiple pieces. This chapter also seeks to show links to the literature discussed in the chapter that precedes it. Chapter three also begins to explore the conceptual underpinning of the project, with an initial look at the notion of the total sound-object. Following on from this, chapter four discusses the compositional processes that led to the sketches for *DDK*. In this chapter, clear compositional and practice-based links are shown to both the preceding literature and the preparatory pieces. Chapter five discusses the necessity for the collaborative development of the *DreamSampler* as a technological solution for the realisation of *DDK*. This chapter also discusses the collaborative process in creative practice. Chapter six discusses the recording and performance of the piece *DDK* and how the performative aspects of this work changes and shapes the piece. Finally, chapter seven outlines a set of conclusions. These conclusions develop the conceptual suggestions stemming from the practical aspects of the project and include an in-depth discussion of the total sound-object as a possible conceptual solution to the research questions. This chapter also continues the discussion around the nature of the collaborative process as part of practical research.

[32] See chapter five.

Chapter seven also lists some identifiable compromises which were made during the creation of the project and discusses some possible areas for further research. As the project was wide ranging and broad in scope, a thorough investigation of multiple parts of the existing literature was important, which is the topic of the next chapter.

Chapter 2: Literature Review

This chapter takes an in-depth view of a wide range of relevant literature. This literature reflects that this research project was designed to investigate and expand upon the numerous ways in which composition and improvisation have been combined during the twentieth and twenty-first centuries in a broad variety of different written, notated, visual, analogue, digital and recorded sources. The project incorporates some developments in digital media and popular music with particular emphasis on real-time notation. The following chapter seeks to demonstrate that throughout the twentieth and twenty-first centuries many practitioners from multiple traditions have sought to combine improvised and composed elements in a number of different ways, often using technology as a mediating device.[33] Because of the breadth of available relevant literature, the discussion that follows attempts to detail the theoretical background to this research by taking a number of individual sub-categories into consideration.

These are as follows:

2a) Jazz and improvised works,

2b) Indeterminacy, aleatory and graphic notation,

2c) Games and conductions,

2d) The New York school, abstract expressionists, Rothko and Pollock,

2e) Barry Guy and Wadada Leo Smith: Improvisation and graphic notation,

2f) Animated scores, real-time music notation and generative animation,

2g) The instant composers pool orchestra's practice as defined by Schuiling; how notation can become ontological in practice,

2h) A new noise: sound-world considerations,

[33] See section 2f and 2h for a detailed examination of this area.

2i) Personal relevant works, performances and recordings.

2a) *Jazz and improvised works*

An integral part of the research is concerned with understanding the various approaches taken by a multitude of different composers working within the jazz and improvised music worlds. Jazz is here defined as the so-called standard practice model, which Derek Bailey describes as, 'improvisation based on tunes in time. The improvisation being based upon the melody, scales and arpeggios associated with a harmonic sequence of a set length, usually a popular song form or the twelve-bar blues' (1992, p. 48).

This research specifically focuses on larger scale works written by jazz composers, including Duke Ellington's *Harlem* From Ellington Uptown (2004, rec 1951-52) and *Such Sweet Thunder* (1999, rec 1956-57); Charles Mingus's *Epitaph* (1990) and *Black Saint and The Sinner Lady* (1963); Ornette Coleman's *Skies of America* (2000, rec 1970) and George Russell's *The Essence of George Russell* (1980). Although all these composers worked within the established remit of the jazz tradition, each of them took approaches that extended what was considered possible for large-scale composition within a jazz context. In addition to these central pieces, the thesis is informed by the small band writing of: Miles Davis (1926-1991); Wayne Shorter (b1933); Thelonious Monk (1917-1982); Charles Mingus (1922-1979); Ornette Coleman (1930-2015); Don Cherry (1936-1995); and John Coltrane (1926-1967).[34]

It is worth mentioning the conceptual work of Gunther Schuller (1925-2015) in *Musings* (1989) at this point as he proposed, codified and then expanded upon the concept of the

[34] See Discography for a list of works from these composers.

third stream. Many of the works listed above seem to be an encapsulation of, or response to, this notion:

> Initially the third stream was a binary fusion of jazz and contemporary classical techniques; later the idea was extended to become a fusion of jazz and classical with folk, ethnic, vernacular, non-western music's as well (Schuller, 1986, pp.114-135).

As we can see from the above quote Schuller's musical conception of the third stream moved from a binary one,[35]concerned with a fusion of just two types of music: jazz and contemporary classical to a pan-idiomatic one. Within his later pan-idomatic concept, Schuller was seeking to integrate a plurality and multiplicity of styles into one new music.

The jazz canon includes several examples of long-form small band pieces, most notably *A Love Supreme* (1964) by John Coltrane. *A Love Supreme* can be regarded as the fulcrum of Coltrane's career in that it allows an understanding of what he did before and what he did afterwards to be ascertained (Ratliff, 2007, p. 90). *A Love Supreme* is a four-movement work for quartet with motivic ties between movements (Jost, 1994, p. 33) and a rigorous, improvised compositional structure (Porter, 1985, p. 596). *A Love Supreme* demonstrates that it is possible to combine improvisation and composition within a large-scale form within a jazz quartet setting. It was also the point at which Coltrane moved

[35] Relating to, composed of, or involving two things (OED, 2018).

into the territory of free jazz.[36] Tony Whyton explores Coltrane's involvement in both jazz and free jazz in his book: *Beyond a Love Supreme* (2013).

Some of the earliest and most significant proponents of the free jazz scene were Coleman, Cecil Taylor (b. 1929), Albert Ayler (1936-1970) and Coltrane. Free jazz took a far more liberal approach to form, melody, tonality and rhythm than the jazz styles that had gone before it, although its very nature means it is musically particular to each individual, group or project (Jost, 1994, p.10). For this project the way in which free jazz lends itself to large-scale group improvisation is of particular interest. Coleman's *Free Jazz* (2002, rec 1961), Coltrane's *Ascension* (2000, rec 1965), and multiple works by Sun Ra including *Angels and Demons at Play* (1965) and *Sound of Joy* (1968) provide not only an insight into the working methods of the genre but also the problems and contradictions that this method can lead to. Free jazz in Europe evolved into free improvisation: a form of music that uses the improvisatory aesthetic of free jazz combined with the harmonic language of twentieth-century classical music. Free improvisation is even more acutely musically particular than free jazz. Both Leo Smith in *Notes: 8 Pieces* (Smith, 1973, p. 84) and Cardew in *Towards an Ethic of Improvisation* (Cardew, 2006, pp. 125-133) provide useful accounts of the twin approaches employed to describe free improvisation. Smith sees free improvisation as an extension of jazz, whilst Cardew considers it in terms of European philosophy and as an extension of compositional indeterminacy (Bailey, 1992 p. 84).

[36] See Jost (1994, pp. 8-16) for an overview of this terminology.

2b) ***Indeterminacy, aleatory and graphic notation***

This thesis also draws upon the work of predominantly American composers who developed and explored indeterminacy and aleatoric compositional practices, specifically John Cage (1912-1992), Morton Feldman (1926-1987), Earle Brown (1926-2002), Christian Wolff (b1934) and Witold Lutosławski (1913-1994). These composers took differing approaches to composition: some, like Cage, favoured using aleatoric techniques at the compositional level, while others such as Earle Brown, used aleatoric processes at the level of performance. Both approaches represent a conscious, deliberate attempt on the part of the composer to employ elements of chance in the creation or realisation of his or her work (Hoogerwerf, 1976, p. 235). Dubiets includes two further definitions provided by Lutosławski:

> Limited aleatory: that is the implantation of an improvisatory structure in an otherwise carefully controlled and structured composition.
> Unlimited aleatory: improvisational elements predominate, with both the compositional and performance aspects being indeterminate, the finished sound shape is only possible in performance and will change given the totality of random elements (Dubiets, 2007, pp. 409-426).

Whole rafts of different aleatoric techniques were subsequently developed from these two starting points. Christian Wolff, for example, became fascinated with the idea of impossible notations, from which he developed an unlimited aleatoric concept, where chains of unpredictable situations in the performance and performance situation directly influenced the realisation of his pieces. In *For One, Two or Three People*, Wolff developed a type of notation which laid out certain spaces of time and groups of

notes that could be selected by the players and were supplemented by a wide range of instructions intended to bring about situations ranging 'from nearly fixed to nearly free' (Nyman, 2010, p. 69). For his part, Cage employed a form of mobile structure[37] in *Concert for Piano and Orchestra* (1958), a piece which:

> May be performed in whole or in part, for any length of time, as a solo or in combination with any other parts or simultaneously with any works that Cage wrote subsequently (Nyman, 2010, p. 64).

This idea anticipates Anthony Braxton's (b. 1945) conception of his compositions as forming part of one larger meta-composition (Lock, 2008). While Morton Feldman composed pieces using traditional notation, he also used specific non-representational graphic notation. An example of this is the *Intersection* series, a series of works in which Feldman maintains control of certain elements, chiefly the form, whilst also allowing the performers to determine others, such as pitch (Dubiets, 2007, pp. 409-426).

Earle Brown developed graphic, mobile and time compositions, including *December 1952* and *Twenty Five Pages* (Dubiets, 2007, pp. 409-426). Nyman quotes Brown as follows: 'What interests me is to find a degree of conditioning (of conception, of notation, of realization) which will balance the work between points of control and non-control' (Nyman, 2010, p.56). This is of central importance to this research, for the central concern is how to achieve a balance between both compositional and performative control and non-control. European composers developed graphic scores

[37] A structure that allows the performers to define the form of the piece (Riley, 1966, p. 311).

further, which culminated in one of the most titanic of graphic scores: Cardew's *Treatise*, a work 'so graphically dense but musically vague' that it provides problems with realisation in performance (Cardew, 2006, pp. 97-135).[38] Cardew is also of interest due to his involvement with free improvisation, which as discussed above is a type of music as much informed by developments in twentieth century classical music as by jazz (Cardew, 2006, pp. 125-132).

Lutosławski began to use a form of aleatorism after hearing Cage's *Concert for Piano and Orchestra* (Rae, 1999, p. 75). His first significant work to deploy the technique was *Jeux Venetiens* (Rae, 1999, pp 75-116). According to Stucky, in this work, '*ad libitum* sections sit side by side with traditionally composed sections' (2009, p. 84), with the movement between these two poles being clearly discernible when listening to the piece (Rae, 1999, pp 75-116).

2c) *Games and conductions*

A third group of composers, specifically Anthony Braxton, John Zorn (b. 1953) and William 'Butch' Morris (1947-2013), have taken many of the structural elements from the above (plus other related compositions) and imbued them with some of the aesthetic and improvisatory considerations jazz. Often by developing and deploying game systems, the use of graphic notations and through conduction.[39] This important development can be regarded as a move towards what David Rosenboom terms propositional music: a form of music where each composition is a self-contained

[38] Cardew wanted a notation that was deliberately difficult to interpret. Allowing the work to be aleatoric and improvisatory in realisation.

[39] Conduction and game systems are defined in greater detail below.

whole, encompassing performance, improvisation and composition (1997, pp. 291-297). This idea is perhaps close to the German concept of Gesamtkunstwerk: a total work of art that synthesises ideas from various disparate and preceding systems to unify them into a new, complete whole.[40] Indeed, in some respects, the idea of both propositional music and Gesamtkunstwerk are precursors to this thesis's notion of the conditionally finished work and what evolves from that: the total sound-object.[41]

Braxton[42] has written many graphic notations (Radano, 1986, p. 506) and also developed what he describes as an improviser's notation (Braxton, 1988), which aims to urge performers into new areas of personal expression and to examine new ways of integrating composition and improvisation. Braxton's works *Compositions 96 (*1993) *and 98* (1990) represent an unfinished, conditional type of composition, with pockets of improvisation permeating a rigorous compositional structure (Lock, 2008).

Morris draws on many of Braxton's ideas to develop what Stanley defines as 'a gestural notational system' (Stanley, 2009, p. 9), which Morris calls Conduction. Conduction entails Morris controlling an ensemble by means of a vocabulary of fifty-two specific conducting gestures (Stanley, 2009, p. 1). Morris himself has said that his interest lies at the point where the interpretation of symbolism (commonly notation)

[40] For an in-depth overview of this see Finger and Folett (2010).

[41] See both the introduction and chapter seven for in-depth discussions of these concepts.

[42] Braxton was heavily involved in the Association for the Advancement of Creative Musicians (AACM). For an insight into the workings of this collective, see Lewis (2000, pp. 78-109).

meets the spontaneity of improvisation (Morris, 2007, p. 169).[43] Morris defines conduction as follows:

> A vocabulary of ideographic signs and gestures activated to modify or construct a real time musical arrangement or composition. Each sign and gesture transmits generative information for interpretation and provides instantaneous possibilities for altering or initiating harmony, melody, rhythm, articulation, phrasing, or form (Morris, 2007, p. 170).

Alto player and composer John Zorn performed in the first ever conduction (Stanley, 2009, p. 59). Zorn then went on to develop a set of similar concepts to Morris, which he deployed in a notably different way in the form of his game pieces (Zorn, 2008). These game pieces have performers follow rules very similar to those used when playing a strategy game (Zorn, 2008). Zorn's idea is reminiscent of Berhman's suggestion that playing a new piece of contemporary music is a lot like learning a new game, with rehearsals initially concerned with 'how to' rather than 'how well' (Berhman, 1965, p58). The game piece most relevant to the present research is called *Cobra* (Zorn, 1994 and 2002) in which the structure and musical events are guided by and decided upon by a prompter (Zorn, 2008). The prompter has a series of cards at his or her disposal, each of which details a specific meaning and musical action, with each musical action being undertaken by the performers on a downbeat indicated by

[43] This are clear parallels here to Braxton. Morris was influenced by Horace Tapscott, Sun Ra, Braxton and the AACM.

the prompter.[44] *Cobra* thus represents another type of embodied notational system broadly in line with that used for Morris's conductions.

2d) ***The New York school, the abstract expressionists, Rothko and Pollock***

The conceptual influence of the abstract expressionists on many of the composers mentioned above cannot be overstated; in no small part because the conceptual concerns of the painter and the composers overlapped. What one group was attempting visually, the other was attempting aurally (Klin, 2016 and Feldman, 2000). The abstract expressionists with particular focus on Pollock (1912-1956) and Rothko (1903-1970) are of great importance to this thesis. What these artists had was not a unified style, but rather an intense interest in developing an individual approach to aesthetic abstraction that nonetheless spoke of the human condition (Klin, 2016, pp. 16-17).

Pollock's expressionism is concerned with the act of improvisation and the creative risk of invention (Rosenberg, 1959). Harold Rosenberg invented the term 'action painting' to describe Pollock's work (Rosenberg, 1959). This term is used to evoke and highlight the act of painting as opposed to the physical object that resulted from it, Rosenberg characterized this act as: 'getting inside the canvas' (Rosenberg, 1959). Steven Johnson (2002) continues along this line of thinking:

> What was to go on the canvas was not a picture but an event. The painter no longer approached the easel with an image in his mind; he went up to it with

[44] The cards often have a similar meaning to the gestures in conduction.

> material in his hand to do something to that other piece of material in front of him. The image would be the result of this encounter. (Johnson, 2002, p.180).

Abstract expressionist work is about its own making; making it ontological in a similar way to Schuiling's observations about the ICP orchestra.[45] Pollock also dealt with an 'all-over approach to the time canvas' (Feldman, 1981, p147). The use of an all-over canvas approach reflects the composition/improvisation dichotomy of musical improvisation, in which the recording acts in the same way as the canvas. Regardless of the preconception, or the 'improvisationallyness' of improvisation, the end result (the recording) is the same: a fixed point. In comparison with Pollock, Rothko's work with his large soft edged clouds of brilliant luminous colour are intensely quiet and nearly still. To stand in front of a Rothko is to feel time slow until it stops (Klin, 2016, p. 17). A further point that is articulated by Feldman is that Rothko's scale removes any argument over proportions, or over degrees or symmetry. It is not form that floats the painting, but the discovery of the right scale, which will hold all elements in equilibrium (Feldman, 1981, p.26). So as with Feldman's music, there is something profound about 'largeness' and radical scale. A further key element for this research emerged from the abstract expressionists' use of the flatness of the canvas. Abstract expressionist art seeks not to hide the perception of the flat canvas or indeed the canvas itself (Klin, 2016, p. 37). Throughout the history of painting the enclosing media (in this case the canvas) has always been part of a painting. Instead of trying to ignore or disguise this fact the abstract expressionists excepted and welcomed it. There is a parallel here with the notion of not trying to hide the fact that a recording is

[45] This is discussed in detail in section 2g.

a recording, even if it attempts to be 'natural'. All recordings are constructions,[46] and perhaps there is an area of interest in treating them as such. This notion is important for this research when considering the total sound-object.[47]

Feldman continues by discussing the need to deal in 'inbetween-ness':

> Creating a confusion of material and construction, and fusion of method and application, by concentrating on how they could be directed toward that which is difficult to categorise (Feldmen,1981, p. 17).

There are some parallels here with the composers working in real-time notation.[48] The works produced via real-time notation might move to a point of becoming something difficult to categorise. In the case of real-time notation specific technologies[49] are the mechanisms by which the above quote is realized. Feldman continues by noting:

> Each of us in his own way contributed to a concept of music in which various elements (rhythm, pitch, dynamics, etc.) were de-controlled. Because this music was not 'fixed,' it could not be notated in the old way. Each new thought, each new idea within this thought, suggested its own notation (Feldman in Johnson, 2002, p.32).

[46] Durkin (2014), Kane (2014) Strachen (2017) are useful for detailed elaboration here.

[47] See chapter seven for a detailed explanation.

[48] Please see section 2f for a larger overview of real-time notation.

[49] Here the differing visual and digital technologies that have been developed for the deployment of real-time scores.

'De-control' and 'collaboration' thus can lead to new forms of notation, a fact which is reflected in this projects use of technology[50] to provide a new type of notation.[51] The new notational ideas proposed and explored by the New York school of composers had a profound effect on the practice of western composers. These new notations led to new performance practices and challenged the relationship between notation, composer, performer and improvisers. In the end this emerging paradigm questioned what the nature of music is. The New York school of composers experimented with graphic and text-based scores as well as multimedia and environmental events (see Kaprov, 1993). The new set of practices begun by the New York school were an important influence on the minimalism of Steve Reich (b. 1936), Terry Riley (b. 1935) and La Monte Young (b. 1935). The New York School of composers (as with their visual arts namesakes) continue to exert an impact on composers around the world (Johnson, 2002, p. 59).

2e) ***Barry Guy and Wadada Leo Smith: improvisation and graphic notation***

Wadada Leo Smith (b. 1941) designed a notation system for scoring sound, rhythm and silence, in combination with scoring improvisation. Smith calls this system *Ahkreanvention* (Smith, 2018). This is reminiscent of Braxton's work on a notation for improvisers (Lock, 2008), the difference being that Braxton's work is a series of gestures that can be interrelated, whereas Smith's conception is something altogether more holistic, with an emphasis on parallel creation between performers.

Smith removes emphasis on the composer/performer dichotomy. Within Smith's *Ahkreanvention* system, duration, improvisation and velocities are controlled through

[50] Specifically, the *DreamSampler*. See chapter five.

[51] Watch *DDK master (score)* included on USB with submission (this is the key piece of work).

a combination of graphical symbols. Smith uses two types of staff: sound staffs of adjustable sound partials, which are either sonically or rhythmically gestural and sound staffs divided into low, medium and high (Smith, 2017).

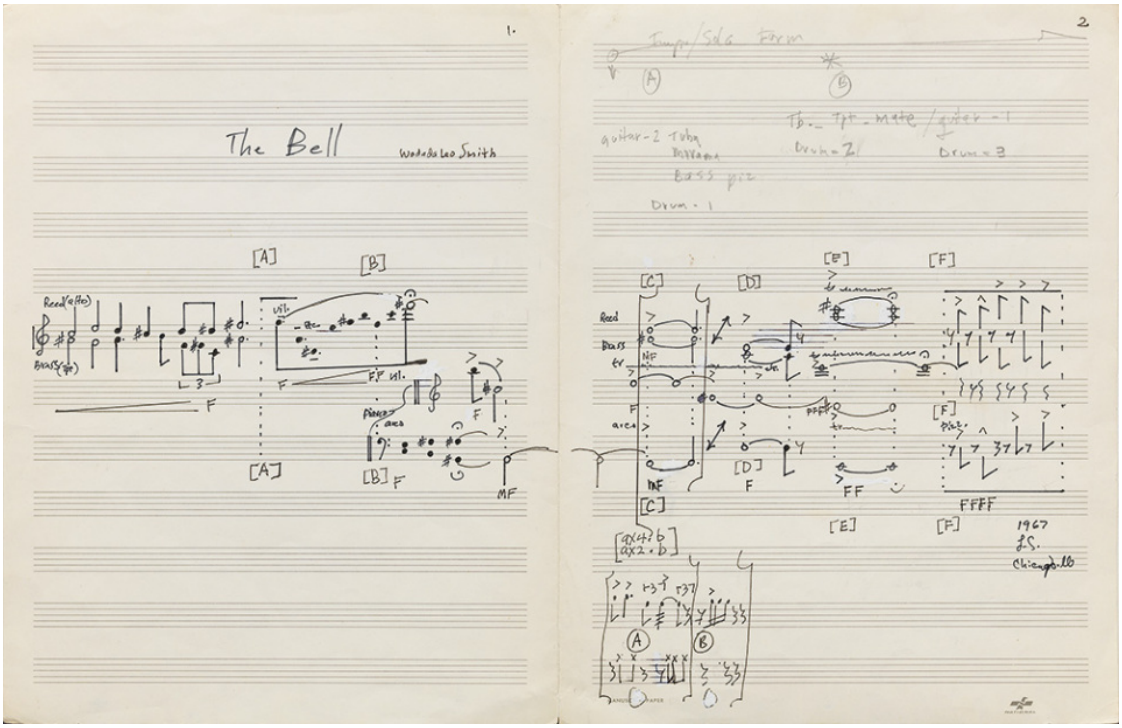


Fig.1, Smith, *The Bell*, Complete score (1967)

The Bell (1967) is an early example of a work by Smith. At this point, he is still clearly using standard notation, although he is straining at the boundaries of what is possible within that system. The importance and interrelation of the visual and performative aspects of the score are beginning to emerge and there is a clear indication that we cannot know what the work will sound like until it is performed. These ideas clearly correspond to this thesis's notion of the conditionally finished piece.[52]

[52] Please see chapters one and seven for a further exploration of this term.

Fig.2, Smith, *Sarhanna*, complete score (2011)

In *Sarhanna* (2011), we can see the development of the graphical and visual style. In comparison to *The Bell* (above), one can notice the use of colour and the use of notational gesture. Implicitly this score will rely on performers interpretation in a far greater way than *The Bell*. This would appear to be a deliberate notational choice taken by Smith.

What is of interest when viewing these scores is the movement over time from the piece *The Bell* to the piece *Sarhanna. The Bell* still has a clearly articulated linear structure and still uses standard notation. *Sarhanna* uses Smith's system *Ahkreanvention* and although the work has a relationship to *The Bell* it is evidently different from the earlier work. What distinguishes this system and score from Smith's earlier works, is the use of colour and considered use of symbols. Smith's scores have

been widely exhibited as art works in their own right (The Wire, 2015). From the perspective of this thesis, in *Sarhanna* there appears to be a balance between the visual and musical elements of the score, and the interpretation (by performers) that that implies. The music produced by the scores and the scores themselves have value that is both independent and interlinked. It is Smith's emphasis on this equality between the two mediums that is of value to this thesis and project. Notably, Smith comments on the implications of new technologies: 'a sound recording is a form within itself… an oral-electronic tradition is being born, this signifies the age of a new improvisation-art-music-form' (Smith, 1973, No Page). It seems from this quotation that Smith had been considering conceptual and practical areas of music making that are only now being opened up by the possibilities of current technology.

The British double bassist and composer Barry Guy is of particular interest to this research. From the early 1970s onwards, Guy has been developing: 'an individual approach to single page graphic scores' (Guy, 2011). His scores are linked by 'a hand gesture and flash card system and they all have as their prime objective the integration of free improvisation with composition' (Guy, 2011). Guy's work stands at an intersection of the composers discussed so far. Although he does not take the leap into using technology, his work seeks to integrate traditional, embodied and graphic notational systems. Guy wanted to develop a performance and compositional practice that was adaptable, letting participants from different backgrounds inhabit a shared musical landscape which was contained in of itself (Guy, 2011). Guy wanted a simple solution that would bring together two quite specific (and often opposing) musical disciplines (notation and improvisation). Guy wanted to develop a system that would

be egalitarian and flattering for performers from both disciplines and allow the disciplines to sit alongside one another (Guy, 2011).

> …the overriding principal has been, to present the material in a concise, clear and practical way for the musicians (Guy, 2011).

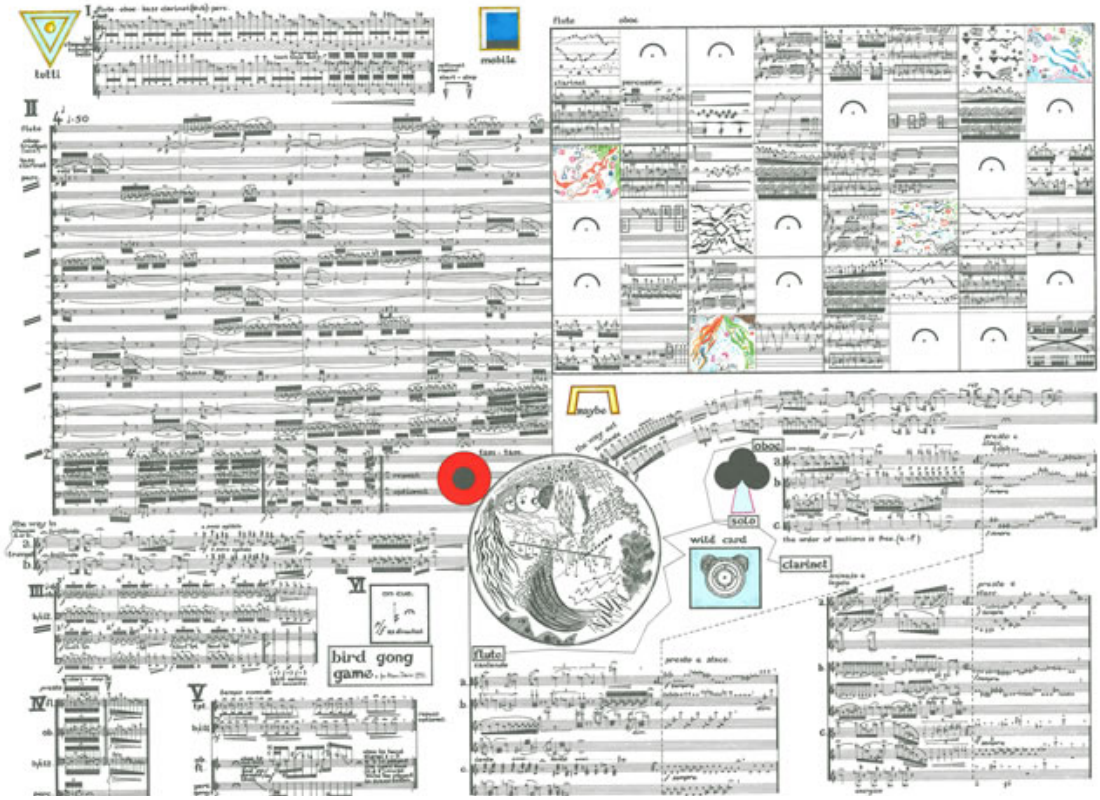


Fig.3, *Guy, Bird Gong Game*, no page (1991-1992)[53]

[53] Apologies for the quality of the score, no better version could be acquired. It should be noted that the detail of the notation is of less relevance to what is being discussed here than the overall gesture an impact of the image.

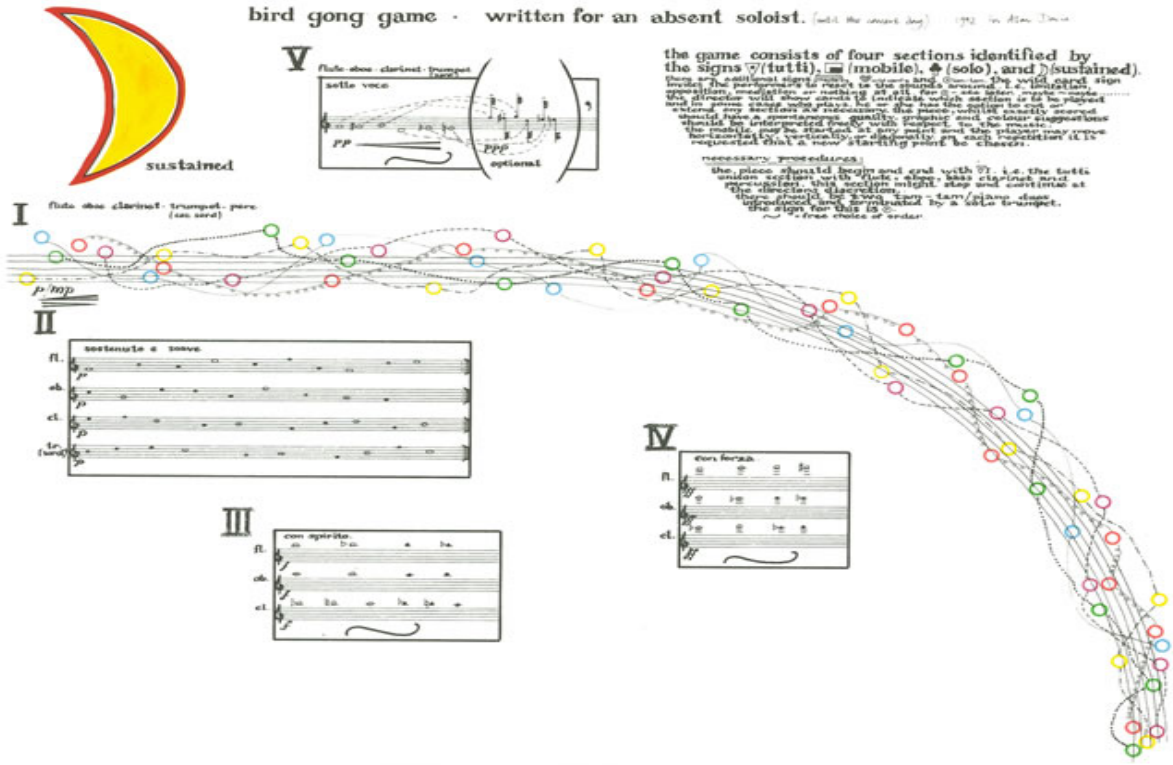


Fig.4, Guy, *Bird Gong Game*, Page 1 (1991-1992)[54]

Guy's work is both visually arresting as well as musically relevant, his work in many aesthetic respects mirrors Smith. There is technical validity to the aspects of his endeavours without any one of those aspects gaining supremacy over the other constituent parts.

2f) *Animated scores, real-time music notation and generative animation*

In the twenty-first century, the impulses of graphic notation (traditional or embodied)[55] and the hybridised systems of Guy, Braxton and Smith have found a new

[54] Previous footnote comments are equally applicable here.

[55] As in Morris for example.

expression within two new linked fields where technology[56] acts as a mediator[57] between the composer and performer. The first is that of the animated graphic score and the second is that of real-time notation.

Animated graphic scores are in some respects quite easy to understand, as they clearly build on a pre-existing set of notions about the performance of traditional paper graphic scores (although there are multiple problems with the performance practice of graphic scores, this isoutside of the remit of this research). Generally, animated graphic scores ask the performer to engage with the material in a broadly similar way to a paper graphic score, but they have the added element of linearity which their animation embodies. They also have something quite fixed about them; you press play and the video rolls, and there is no manipulation of the material once it has started. There are numerous examples of this kind of score: *Graphic Score 1* (2009) by Leafcutter John (b. unknown) is a fairly basic example of this type of piece. In the piece, pitch and dynamics are related to vertical movement, colour represents an instrument and events happen in time as the piece scrolls. More relevant for this research is *Nature Forms 1* (2014) by the composer Lindsay Vickey (b. 1965). The piece, while ostensibly similar to *Graphic Score 1*, begins to move towards a second narrative which is perhaps best defined as real-time musical notation. *Nature forms 1* is of interest as it uses manipulated natural forms[58] as a starting point for what becomes its notational language and syntax. Clay and Freeman (2010) have done

[56] As we are moving into a discussion of animated graphic scores and real-time notation, here technology refers to the varied technologies that allow those systems to function.

[57] The technology deployed in the various animated and real-time notated scores intervenes in the difference between composer and performer suggesting ways to dissolve the implicit/ historical hierarchy in those definitions.

[58] Images and sounds from nature.

extensive research in the area of real-time notation and they describe it in the following way:

> Our research indicated that an emerging community of artists and composers are working in this loose field, often described as 'real-time music notation' but also 'dynamic music notation', 'live scoring' and 'reactive notation'. There is little in the way of standardised procedures or technology to implement these procedures. But it is evident that this emerging practice (in which practitioners come from many creative backgrounds: composition, improvisation, coding, visual and installation art…) recalls earlier experimental and open-form compositional methods as well asking new questions about the relationship between composers, performers and listeners. Unlike an animated graphic score, a real-time musical notation will be altered in some way during performance (Clay and Freeman, 2010, no page).

Hope and Vickery (2011) continue when they discuss the expanded range of approaches apparent in real-time notation predominantly gives rise to either a dynamic or a static arrangement of materials. This arrangement is analogous to traditional print text and computer-based hypertext (Hope and Vickery, 2011).

In the piece *356°* (2011) by Aki Asgeirsson (b. 1975), we see box notations similar to some of the box notations used for several of the preparatory pieces in this research project. This is likely due to a shared set of compositional roots best seen in collected sets of scores like *Notations* (Cage and Knowles, 1969) and *Notations 21* (Sauer, 2009). Box notations have become a standardised method of composing in open form

situations. In *356°*, fixed notations are animated, and the movement of the notation necessarily influences and impacts on the performers' relationship to, and interpretation of, the score. The box notation becomes multifaceted because it moves. To represent a similar level of complexity and information in a paper score would require many pages.

The composer Paul Turowski (b. unknown) works with a number of different real-time notation models. His work *Hyperions* (2014) moves into an aleatoric compositional area and is an example of an interactive score in which real-time performance decisions influence the graphic score creating a feedback loop with the performer. The real time performance decisions in this piece also act as triggers for the playback and processing of sounds recording during performance. In the piece *SQ* (2012), a digital score is generated in real-time, augmenting a traditionally fixed western music notational system. This type of score allows for a subtly randomized composition; it also facilitates the dynamic shaping of visual cues in an attempt to convey musical information in novel and intuitive ways.

The composer Pedro Rebelo (b. 1972) in his piece *Netgraph* (2012) moves the narrative towards a discussion of how real-time notation can be used to shape performances in a context that is specifically geared towards performers with a heavily improvisational background. For example, Evan Parker (b.1944) is a regular collaborator of Rebelo. *Netgraph* consists of a series of scenes around specific mobile graphic constructions and is designed for a networked performance.[59] The notation

[59] The graphical elements of the composition are 'beamed' to various computers and tablets that each individual performer can view.

reflects structures and interactions between three players and suggests gestural interpretation to both musicians and audiences. As a composition *Netgraph* moves into the realms of a graphic and heavily designed aesthetic, bringing to mind Cardews *Treatise* (1963-67).

Richard D James's (b. 1971) piece *Remote Orchestra* (2011) is another example of real-time notation. From a musical and visual perspective, the piece is not particularly convincing. The musical gestures are too broad and there is not enough musical control. Visually, the projections of the networked images (the control surface) are basic. However, what is of most interest for this project is the attempt to convert a computer music staple (the midi controller) into a visual medium that allows the performers to become a 'node' in a larger system: in some ways the performers become samples.

The composer and media artist Alexander Dupuis (b. unknown) in his piece *Ramus* (2009) explores the possibilities of his self-designed audio-visual system. In this piece, the modified solo cello interacts with the visuals to create a feedback loop score. The computer also modifies specified sounds from the cello. The piece (as a result, perhaps, of Dupuis' background in new media) has particular interest in regard to the aesthetic value of the visual elements. The visuals that are created during performance are in no way the junior partner to the music. *Ramus* makes us consider a general effect of the digital revolution and as Manovich says: 'Many avant-garde aesthetic strategies became embedded in the commands and interface metaphors of computer software. In short, the avant-garde became materialised in a computer' (2001, p. 258). Picking up on this point Hope and Vickery argue that:

> the advent of cheap, portable and powerful computing has and continues to cause paradigm-shifts in the development of many facets of musical endeavour, not least the screened ('real-time') score. Simple configurations of equipment will now facilitate projection of the score. Computing also provides a medium that permits novel approaches to the manipulation of materials, namely real-time algorithmic permutation, transformation and generation. The sharing of previously hidden aspects of the performance via video projection is becoming increasingly common in the presentation of New Music (Hope and Vickery, 2011).

Real-time notation is reliant upon projected elements for its realisation, leading to questions around what is being projected. Non-standard graphical notation will, by definition, be unfamiliar to the performer. The graphical elements and performance practices employed in realising non-standard symbols can led to a unique type of engagement for the audience. Modern audiences constantly negotiate the relationship between picture and music through engagement with multiple media. The non-standard visual imagery of real-time notation may call for a new type language to aid interpretation (Hope and Vickery, 2011).

The drawback of real-time notation is that it has a tendency to shift the focus of the work to one of the three elements of the system. Either the system built to produce the work seems to be of primary importance, the music produced is of primary importance, or the visual elements of the work are of primary importance. Potentially the reason for issues in this area is simply that the complexities of each element are

very great. This resonates with assertion and general thesis in the book *Decomposition* (Durkin, 2014) that all music should be and is collaborative. A formulation of real-time notation that is collaborative in nature may have great potential to develop in a multitude of ways, as well as balancing the three elements that are in play. From a subjective viewpoint and aesthetic, Alexander Dupuis' *Ramus* seems to be the closest to striking a balance between the visual, the musical, and the generative process. The generative part of this piece is in the visual area. *Ramus* uses point-to-point generative animation.[60] Another good example of this technique is in *The Snail and the Slope* (Todorovic, 2009). Todorvic (b unknown) works with code and generative systems within the programming environment *Processing* (Processing, 2018). *Processing* is a visual coding language that was developed at the Massachusetts Institute of Technology (MIT). The aesthetic of Todorovic's work is organic but is being produced by a computational algorithm. *Attraction and Repulsion - Particle Study I* (2009) by Leafcutter John is another example of a generative animation made with *Processing.*

2g) *The Instant Composer's Pool orchestra's practice as defined by Schuiling; how notation can become ontological in practice*

Following on from Guy's idea that notation of any type must be presented in a clear and concise way (Guy, 2011), we must give due consideration to the work of Misha Mendelberg (1935-2017), Han Bennick (b.1942) and the Instant Composer's Pool (ICP) orchestra. When considering Mendelberg, Bennick and the ICP orchestra, particular attention must be given to the work that Floris Schuiling (2014) has done

[60] For an overview of generative and point-to-point animation see: *Thoughts on generative art* (Hoff, 2018)

creating a theoretical framework around their methods.

Mendelbeg and Bennik created the ICP orchestra to stand firmly between the classicist notion of jazz (that is the American neoclassicist definition)[61] and the European conception of jazz and improvisation (Smith (1973) and Cardew (2004)). Mendelberg was a member of a Dutch school of composers which included Louis Andriessen (b.1939) (Service, 2012). Bennick is one of the A-list free improvisers in Europe (Efi and Bennick, 2018). Through their work together in the ICP orchestra, Bennick and Mendelberg created a new type of music which relies upon notation but sees it as only one aspect of a wider ecological understanding of music making. These include: physical skills developed on an instrument, the interaction amongst musicians through gestures and glances, and a multi-sensory experience of musical sound (Schuiling, 2016, p. 207-211).

Mendelberg, Bennick and the ICP orchestra describe their method as Instant Composition (ICP Orchestra, 2018). Schuiling argues that Instant Composition was/is an attempt to construct an ontology of music that relies neither on the concept of completely uninhibited improvisation, nor on completely determined composition. Instant composition advocates a concept of composition, whether notated or not, which was completely embedded within music. Here composition is considered as a cultural, creative and social practice instead of the more usual understanding of composition: as an abstract, purely intellectual concept concerned with musical

[61] As discussed earlier, but perhaps best summed up as 'Improvisation based on tunes in time. The improvisation being based upon the melody, scales and arpeggios associated with a harmonic sequence of a set length, usually a popular song form or the twelve-bar blues' (Bailey, 1992, p. 48). Jazz neoclassicism is a position that is largely exemplified by the trumpeter Wynton Marsalis (b. 1961) and the critic Stanley Crouch (b.1946)

structures that are distanced from the real world. In this definition improvisation is ubiquitous; it not only includes the intentionally spontaneous generation of musical ideas, but also the continuous adaptation to a constantly responsive and active environment. This consists of other people as well as discursive and material processes. An exclusive focus on the practices that we usually label as improvisatory generates a necessarily incomplete picture, not only of the conditions which make these practices possible, but also of the compositional aspects of these practices themselves (Schuiling, 2016, pp. 207-211).

As well as suggesting a reconsideration of improvisation, Schuiling considers a rethinking of composition, or rather of notation. Schuiling argues that the historiography of Western art music has been predicated on the assumption that music notation contains all the relevant information about music. The history of music becomes an 'internal' history of the development of the structures depicted. This internal history is set against an 'external' history of the social developments that surrounded them. Schuiling believes that considering the ICP's methodology, such a distinction breaks down as notations are themselves an inherent part of musical culture, not just considered as 'aide-memoires' or prescriptions for social interaction, but also in the depictions of structural qualities as means for imagining an ontology of music (Schuiling, 2016, pp. 207-211).

In a similar vein David Borgo (2015) suggests that many discourses[62] on music frequently reinforce distinctions between composition and improvisation; music and noise; sound and silence; and tradition and innovation; aspects which under closer

[62] It should be noted that Borgo isn't clear about who, what or when these discourses are formulated.

scrutiny, seem untenable. In the act of musical improvisation, individuals balance comfort and caprice, groups enable structure and spontaneity, and traditions become articulated by and respond to both continuity and change (Borgo, 2015, p. 192).

If we extend these arguments, we can say that many notations exist outside the usual boundaries of Western art music.[63] Examples would include, but not be limited to conduction, graphic scores, real-time notation, live coding, midi notation, sampling and free improvisations. Any or all of these when embedded within Schuiling's broader conceptual definition of notation can be considered to be a specific and separate musical notation/ontology. Each is capable of forming a different way of connecting the abstract nature of musical sound to multi-sensory understandings of music. These include kinaesthetic, tactile, and visual means of understanding, as well as the technical and physical aspects of performing music. These innovations in notation co-construct very particular assemblages of music, which may have their own ideas of agency, creativity and social values. As such, they do not only construct forms of creative collaboration, but also means for imagining music itself (Schuiling, 2016, pp. 207-211).

2h) ***A new noise: sound-world considerations***

The literature explored so far has identified key areas which were built upon during the project. The notion of the sound-world is a key element of this project. Exploring the notion of the sound-world led to an investigation into areas of electronic sound production and electronic music. Not least because the emergence of technological and electronic manipulation of sound exponentially increased the sonic palette

[63] Which encapsulates notions of the composer/score, conductor, performer hierarchy.

available to practitioners.[64] The literature is considerable on composers who work in the field of electronic music. The world of electronic music is diverse and includes early pioneers like Schaeffer (1910- 1995) and Subotnick (b1933), but also includes artists such as Autechre (Warp, 2018), Oval (Allmusic, 2018) and Brian Eno (b.1948).

Pierre Schaeffer (1910 – 1995) was one of the founders of the musique concrète movement and is its chief theorist. Schaeffer felt that this radical new music, based as it was in recoded and manipulated sound, needed a new theoretical underpinning and wrote extensively about what shape this might take. In both *In Search of a Concrete Music*, (Schaeffer, 1952, trans 2012) and *Treatise on Musical Objects* (Schaeffer,1966, trans 2017) Schaeffer discusses his ideas of sound-objects: a recorded and manipulated sound which has been sonically transformed making it impossible to tell what the sound was or how it was produced (Schaeffer, 1952, trans 2012 and 1966, trans 2017).[65] Related to the sound-object is the notion of the acousmatic situation and what Schaeffer terms reduced listening. Schaeffer suggests that:

> The acousmatic situation changes the way we hear. By isolating the sound from the audio-visual[66] complex to which it initially belonged and creating a sound-object, we create favourable conditions for reduced listening. Reduced listening

[64] For historical background and explanation here see Milner (2007), Durkin (2014), Kane (2014), Strachen (2017) and Schaeffer (2012). The possibilities of technological and electronic manipulation of sound and the impact that has on all aspects of music is a huge area that has been very broadly explored.

[65] Here Schaeffer is talking about the means of production in terms of acoustic sounds.

[66] Here Schaeffer is talking about the visual link between an instrumentalist playing a sound and the sound produced.

> concentrates on the sound for its own sake, independently of its causes or its meaning (Schaeffer in Kane, 2014, p.4).

Brian Kane in *Sound Unseen* (2014) extends and examines Schaeffer's theories, linking them philosophically to both phenomenology and post-structuralism. Schaeffer's conceptions of the sound-object and the acousmatic experience allow for the construction of sound-worlds which are discrete unto themselves. The discrete sound-world is important within the context of this research.

Glen Gould (b1932-1982) in his 1966 essay *The Prospects of Recording* describes what he sees as the possibilities of recording. Gould postulates that recording, rather than concert-going, may well be the primary way that we (as listeners) engage with music in the future. From our perspective in 2018 it seems almost self-evident that recorded music has become the chief way in which music is listened to and consumed. As Ratliff (2017, pp. 1-8) has pointed out, the shift from live listening to recorded listening is part of not only a profound shift in how we listen to music, but how we make and produce music. Much contemporary recorded music is not directly related to any live event. With music that uses sampling, the performers of the sampled music are separated by time as well as space (Miller, 2014, p. 11). Digital editing makes it impossible to tell what is live and what is not. With digital musical tools such as midi, the notion of what is live itself comes into question. The question as to how it might be possible to construct an overall ontology of music and notation, which works within a notion of a constructed recorded reality is perhaps overly broad. Certainly, any genre of music, which has electronics at its heart in some way, can be seen to raise questions about the nature of the live event in terms of an overarching musical

ontology. A more beneficial question may be to ask: *How it is possible to bridge the gap between the perceived static construction of recording technology and the open notions of improvisation and instant composition, in order to create a piece of music which allows both elements to become part of something larger?*

The answer would seem to be multifaceted: the deployment of real-time notation would allow improvising performers/individuals to become part of a bigger collaborative system which was designed to be an aggregate of its individual parts. The system (in this case a real-time notation system) should accept a level of ambiguity whilst aiming for a complexity of interaction. It is designed as a garden rather than as a building. A complex system will be an amalgamation of smaller systems which can work individually, in this case the individual performers (Borgo, 2015, pp. 192-193). David Borgo in his book *Sync or Swarm* describes complex musical systems in the following way:

> Systems of this sort are able to take advantage of positive feedback and cultivate increasing returns. They exploit errors or unexpected occurrences, assess strategies in light of their consequences and produce self-changing rules that dynamically govern. Complex systems however, must strike an uneasy and ever-changing balance between the exploitation of new ideas or territories and the exploitation of strategies, devices and practices that have already been integrated into the system. In other words, complex systems seek persistent disequilibrium; they avoid constancy but also restless change. Because of this uneasy balance, complex systems are not necessarily optimised for a specific goal; rather, they pursue multiple goals at all times. Although they cannot be explicitly controlled,

> they can respond to guiding rules of thumb and are susceptible to leverage points of intervention (Borgo, 2015, pp. 192-193).

If Borgo's assertion is perhaps overly abstract, then George Lewis helps to ground the concepts when he says:

> …such a new music would need to draw upon the widest range of traditions, while not being tied to anyone, this music would exist in a multifaceted time in which rhythms, styles, and codes diverge, interdependencies become more burdensome, and rules dissolve, it would be, in short - a new noise (Lewis in Borgo, 2015, p. 192).

We will now turn our attention to practitioners who are currently working in areas that correspond to some of the above criteria. Specifically, and in contrast to many of the composers engaged with real-time notation discussed earlier, the following musicians come out of a musical world that is strongly identified with jazz and improvisation and are perhaps now best described as being examples of pan-idiomatic improvising (this type of improvising is perhaps closest to Schuiling's definition).

Mark Gulliena (b.1980) is a drummer and composer who is most easily identified with the current jazz scene, his album *Beat Music - The L.A. Improvisations* (2014) being the most significant for this thesis. In many respects this album inhabits a similar sound-world to much of my own previous work and was even conceptualised in a similar way (Sweetman, 2014). The album demonstrates a set of common electronic improvisations which are shaped after the fact. Recorded in one day, in what feels like

one long, rolling session, the album consists of thirty tracks which run from just twelve seconds in length through to four minutes (Sweetman, 2014). Many are little snippets and beat ideas, between one and two minutes in length. The episodic nature of the record not only shows the influence of hip-hop but also reflects the way it was constructed (Sweetman, 2014).

Rob Mazurek (b1965) is a cornet player, composer and sound designer. Mazurek works in composition, improvisation, and the visual arts (Mazurek, 2018). Mazurek has built a performance and compositional practice that references multiple musical traditions, synthesizing them into a unique and personal language (Mazurek, 2018). Mazurek's work with the group São Paulo Underground is of particular interest to this research. São Paulo Underground have built a vernacular and ontology that blends improvisation with Tropicana, underpinned with electronics. In much of Mazurek's work we can see clear aesthetic links to musique concrète and electro-acoustic music. Mazurek's cornet playing is often augmented by computer programming, electronic effects and keyboards. Mazurek's musical practice is informed by his work as a visual artist and his scores often display a high level of reciprocity with his visual and multimedia work (Mazurek, 2018). The musical and visual aspects are inseparable in the work *Android Love Cry* (2016) a work that is an electo-acoustic exploration of a graphic score. The score is also available as a lithograph. Mazurek seems to give the musical and visual elements of the work equal aesthetic weight.

Zach Danziger is a long-established drummer and composer (Micallef, 2018), and has continually been at the cutting edge of what is possible when combining improvised music and technology. As he says: 'The key to being musically youthful is to really

embrace the newer stuff… because you genuinely like it… I want to be influenced by all this stuff… I don't want to stay static' (Danziger, 2013, YouTube). Starting in the mid-nineties he was revolutionary in considering (along with Tim Lefervre (b1968)) how it might be possible to integrate the new language of dance music (specifically drum and bass) into the pre-existing vernacular of improvised music (Micallef, 2018). This is particularly evident on the *Bedrock* albums by Uri Caine (2001).

Danziger also produced a project called *Boomish* (Micallef, 2018) this project moved from being a live drum and bass band to doing audio-visual projects like the *Play at Home Version* (Boomish, 2004). The *Play at Home Version* was very innovative for its time, integrating video as an integral part of performance. This was a significant achievement considering the decade (1990s) and the technological limitations inherent in the available technology. Currently Danziger is involved in two main project: Mr Barrington and Edit Bunker. Mr Barrington, is a band which deconstructs the popular vernacular sound-worlds exemplified by bands like Knower (Knowermusic, 2017). As he did with the vernacular of drum and bass, Danziger integrates a new sound-world and vernacular into a larger pan-idiomatic approach (Micallef, 2018).

Edit Bunker is a duo with the bassist Owen Biddle (Micallef, 2018). It is this project that is of the most interest to this research on several levels. Firstly, Edit Bunker carry on Danziger's interest with live video as a source. Secondly Danziger and Biddle have taken available technology and contorted it into some areas in which no one else is currently working. This is most ably demonstrated by the Ted talk that they gave in 2013 (Danziger and Biddle, 2013). In this talk they demonstrate their midi setups and how they can interact with not only their own instruments but that of their collaborators as well as the video feed (Danziger and Biddle, 2013). What they manage to achieve is a situation in which aspects of technology designed to guide the

musician are instead guided by the musician, this could be considered (in some small way) an emancipation of the musician from the technology.

2i) ***Personal relevant works, performances and recordings***

All of the following are ensembles, performances and compositions that I both performed with and wrote for, prior to (and in some cases concurrent with) my PhD.

Examples of Twelves was an ensemble that I ran in various incarnations from 2005-2013. At points, this was just me working as a composer in isolation, at other points there were various iterations of the project as an ensemble. I was the only person that composed for this project using a mixture of approaches. Examples of Twelves encapsulated many of the concepts that this thesis seeks to explore. The three albums/suites made as Examples of Twelves were: *The Way Things Were* (2006*), The Way Things Are* (2008) and *Things Will Be* (2011). These works can be looked at as one long piece, as each one has its own internal form, but the themes (whether gestural or explicit) continually reoccur. All three are concerned with the various ways in which composition and improvisation can be integrated. The album/suite *The Way Things Were* (*Examples of Twelves*, 2006) is the most obviously 'jazzy' of the three, using standard practice approaches to both chord changes and free playing, although the combination of a jazz octet and a string quartet do point towards an integration of vernaculars. *The Way Things Are* (*Examples of Twelves*, 2008) builds on the *Dogme*[67] ideas developed within the group The Electric Dr M,[68] in which the music

[67] See below for a longer explanation of Dogme.

[68] The Electric Dr M personnel were: Matthew Bourne, Chris Sharkey, Dave Black, Sam Hobbs and Riaan Vosloo (The Electric Dr.M, 2003).

constructed, the rhythm section, and electronic parts, were improvised in layers. The piece was then composed by shaping the layers of improvisation with the help of a computer (perhaps suggesting a primitive way in which technology can mediate between composition and improvisation). The melodies and upper parts of the work were then written in standard fashion and layered over the top of the results of the shaped improvisation. The last suite, *Things Will Be* (*Examples of Twelves*, 2011) integrates, approaches from both previous suites, but with a greater degree of complexity in harmonic and rhythmic terms. It also contains sections of composed aleatory and conduction, thus making this the most conditionally finished of the suites. The techniques employed thus link back to Braxton and Morris, in which the composition is conditional: when it is not being performed, it is in a state of stasis. Conditional compositions can only become and be finished during each performance; each performance is unique, and the becoming will be context dependent. Conditional compositions are distinct from improvisations, in so far as there is enough compositional material that they maintain some compositional identity, however tenuous.[69]

The group Twelves is an ongoing project, of which I am a member (Twelves 2008, 2011). Twelves have developed a strong aesthetic through continuous performance. Many of our pieces are most easily understood as conditional compositions. Initially Twelves was a trio that consisted of myself on bass, saxophonist Mark Hanslip and Drummer Tim Giles. After recording our first record *Here comes the woodman with his splintered soul* (Twelves, 2008) we added guitarist Rob Updegraff. Much of the material we perform contains a very limited amount of written material, thus allowing

[69] See chapter one and seven for a discussion of conditional compositions.

the material to be reshaped anew each time it is played. Regardless of how the material might be reshaped, the material still has enough compositional essence to stay coherent; all of our material is conditionally finished. We have also developed a group/piece specific musical vernacular, with this giving the ensemble a strong identity.

The Electric Dr. M was an older but significant project of mine. We were inspired conceptually by the Dogme 95 filmmakers. Dogme 95 was a Danish film making movement started by Lars von Trier (b. 1956) and Thomas Vinterberg (b. 1969) in 1995. The movement produced two manifestos *The Dogme 95 Manifesto* (Von Trier and Vinterberg, 1995) and the *Vows of Chastity* (Von Trier and Vinterberg, 1995); these were essentially artists' manifestos and mirror/echo many of the artists' manifestos from the Futurists to the Stuckists (Danchev, 2011). What Von Trier and Vinterberg wanted to do was to create a set of rules which would allow them return to what they considered 'traditional' film making, which for them was film making based around narrative (Von Trier and Vinterberg, 1995). They also wanted to depart from what they considered to be too much technological interference, eschewing both artificial light and special effects (Von Trier and Vinterberg, 1995). The members of *The Electric Dr.M* developed our own musical version of the Dogme 95 manifesto. This was a set of rules designed to govern how one might go about making a recording. This entailed each player recording their improvisation separately with no discussion with the other members of the group. Drums were recorded first, with bass and guitar then being recorded improvising to the recording of the drums. The pieces were then completed with the addition of keyboards and samples improvised to the recordings of the other instruments. The recording was then shaped/composed by the

members of The Electric Dr.M at the mixing stage and exhibited a surprising degree of coherence within the work as a whole. The idea of improvising first and then composing second proved a most interesting approach, representing a direct reversal of the standard practice model. As with the examples of Twelves, it is also conceivably a primitive example of technology acting as a mediation between composition and improvisation.

In 2014, I had the opportunity to perform the piece *Foliage* (2013) several times with the composer Elliott Sharp (b.1951). *Foliage* is a projected graphic score that Sharp has produced by visually manipulating scans of his earlier written works. This is another approach to sampling one's own work. Sharp then collated the slides produced in this fashion into a linear piece. Each slide morphs into the next one and the linear development in the piece is achieved by the players jump cutting each time a slide changes. As Christian Marclay puts it in his *Foliage Forward*:

> By creating what is essentially an animated graphic score, Sharpe creates a visual equivalent to what is possible with software in a live performance and altering what is seen in a similar way to what is heard. By modulating, distorting, filtering, stretching, multiplying, layering, inverting and blurring images, Sharpe goes someway to developing an alternative to the traditionally written score. Sharpe's new notation is not only interested in blurring the distinction between structure and improvisation, but also between digital and analogue. Electronics are not only tools for him to extend the potential of acoustic instruments but are also a new way to write music. It is this balanced approach that lets the piece retain a tactile and acoustic quality in live performance (Marclay, 2012, online).

The experience (combined with the research done into the work of the real-time notation) of working with a projection for the first time led me to seriously consider the idea of a projected score as a way of controlling and guiding a performance. *Foliage* is linear: once the video has been started, you play the piece until the end. In some respects, this approach is synonymous with a standard score (although maybe this is true of all music as regardless of how the music is created). Perhaps the listener will always perceive music in a linear way since it is time dependent. However, this does not mean that alternative means of musical production should not be sought. Indeed, we are at a unique point in the history of music, wherein the means of production can be completely obscured from the listener; this in turn calls into question many notions about authenticity and the nature of the real. It occurred to me that it might be possible to create a series of projections combining a number of different notations, encapsulating the same freedom of form found in the methodology of both conduction and the game pieces, but without a prompter or conductor. If one of the musicians, or feasibly all the musicians involved with realising the piece, could control the form this would be a positive; as I had an intuition that the decisions about form would be made based on the experience of being inside the performance. It is this notion that informed both the development of the methodology and the project activity. Moving towards the musical language of the main piece started with the explorations of the preparatory pieces.

From studying the literature laid out in this chapter, it is clear that a number of solutions have been deployed and multiple approaches have been taken to both the integration of differing compositional techniques and performative notions of

improvisation, in contexts of differing sizes. The more traditional and idiomatic examples presented above, up to and including the paper graphic notations discussed, show ample evidence of works that are extended, both in terms of the forces deployed and the length of the pieces. The practitioners working within real-time notation have, as we have seen, deployed technology[70] in the practical realisation of scores. The literature also identifies those practitioners that deploy technology[71] as part of sound-world construction, which goes on within multiple examples of pan-idiomatic improvisatory contexts. It is not clear if these practitioners have a conceptual underpinning (along the lines of what Schaeffer suggests) to underpin their work. This research and associated outputs seeks to inhabit a space somewhere in-between these multiple points to create something new. The first step in this direction was the composition and realisation of the preparatory pieces that are part of this submission.

[70] As stated before the technologies here are the various ways that the scores are manipulated and projected.

[71] Here we are discussing various sonic processing and manipulation tools.

Chapter 3: Methodology and Project Activity One:

Preparatory Works

The following chapter examines the development of the preparatory pieces which are submitted in support of this research. The preparatory pieces are presented in two sections,[72] both serve to help chart the development of different facets of this research and the compositional process. These are presented in two folders, both on the submitted USB stick and where appropriate as paper scores. The two folders are named Establishing a Compositional Toolkit and Towards a Sound-world. The rationale for this division is essentially made down sonic lines. The pieces in Establishing a Compositional Toolkit are acoustic in nature whereas the pieces in Towards a Sound-world are more electronic in nature. Within both folders an attempt has been made to group pieces together in a compositionally evolutionary way, so that links can be made in the commentary about the use of similar techniques and approaches and the differing ways that they have been deployed. Many pieces are submitted in multiple versions. These are often different instrumentations but still within the same section, i.e. either Establishing a Compositional Toolkit or Towards a Sound-world. In some cases, there are pieces with versions in both sections, these are treated as discrete works and are discussed in both.

The first set of pieces included in Establishing a Compositional Toolkit are as follows: *Taps* (Three versions: Piano quintet, piano trio and jazz quartet); *Arches*; *Bean (Decibel)*; *Algernon and Solstice*; *Conduction No.7*; *Curves* (version for string quartet); *No.2; Line Pieces no. 1-6*; *Slide Pieces no. 1-5*; *The Last Few Days*; *Personal Growth; Forrest* (Three

[72] Which can be found in the corresponding folders on the submitted USB stick. There are also both digitised and hard copies of scores where appropriate. Please see both the chapter one for an overview of the file structure of the USB stick.

versions: Piano trio, solo piano, and string quartet); *Today, Today….; Henry Foxwood Goes To Town.*

The second set, Towards a Sound-world, includes the pieces: *Tape Loop* 1; *Lost People*; Bean (Memory moog version); *Curves Bells* (Memory moog version); *Curves Strings* (Memory moog version); *Curves* (combined version); *No.3*; *No.4*; *No.5*; *The Black Whole*.

This chapter also begins to give some consideration to the role of collaboration within the project. As William Gibson points out:

> Artistic collaboration is a strange business. Do it right up to the hilt, as it were, and you and your partner will generate a third party, some thoroughly other, and often one capable of things neither you nor the very reasonable gentleman seated opposite would even begin to consider. "Who," asks one of those disembodied voices in Mr. Burroughs's multilevel scrapbooks, is the Third who walks beside us? (Gibson, 2012, p. 23).

The above quote neatly encapsulates a specific approach and understanding of collaboration which informed some of the decision-making process for this project. When setting out to write the preparatory works, I often had performers in mind for their performance. Indeed, this Ellingtonian approach has been a long-standing part of my compositional practice. Many of these pieces have been performed by players that I know well and have longstanding musical relationships with. They bring an unquantifiable quality to the performance of the preparatory pieces initially, and latterly to the performance of *DDK*. I have largely subscribed to the approach of writing for the person and not the part. Often, this allows unspoken musical shorthand

to come to the forefront of the compositional process, allowing me to think about compositional areas rather than specifics.

Although the preparatory works are roughly divided into acoustic and electronic pieces, there is a certain amount of crossover. There are unifying compositional factors within the pieces regardless of category; most are partially, or wholly conditional.[73] As the research progressed, I started to seek a more holistic approach to idiom and genre. I also started to consider the sound-world these pieces inhabited in a more nuanced way. Once the concept of sound-world was synthesised with the conditional elements of the preparatory pieces, the research moved towards both the notion and practical formation of the total sound-object.[74] The piece *DDK* was the resulting output of the research, it attempted to realise the concept of both the conditional piece and the total sound-object more fully.

It should be noted that all of the preparatory pieces share a desire to explore what can be best described as the 'meta' element of notation. Understanding how different notations, schema, absences and additions elicit different responses from performers has been a key developmental element of this project. Furthermore, choices have consistently been made to notate[75] or develop performance schemas in specific ways. These choices have been made in a deliberate and controlled way, with other notational and/or schematic options being disregarded as they did not/could not achieve the desired sonic, compositional or performative effect. It is hoped that the

[73] See chapters one and seven for a longer explanation of this idea.

[74] See chapters one and seven for a longer explanation of this idea.

[75] Either traditionally, graphically, box, animated, real-time or combinations of these.

above intent is observable in both the practical elements of the project[76] and when observing this thesis and project as a whole. It is hoped that a consideration of the relationships between each of the preparatory pieces, the preparatory pieces and *DDK*, and the development and performance of *DDK* using the *DreamSampler* illuminate the above considerations of 'meta' notation.[77] Furthermore it is hoped that when this current chapter and the pieces described within it are considered alongside viewing or listening to *DDK*, further deliberate notational and compositional choices can be observed.

3a) ***Establishing a compositional tool kit (acoustic pieces)***

The focus in this group of pieces was to consider compositional conditionality.[78] Each piece was designed to explore this concept in differing ways. Many of the pieces took conditional compositional elements from the composers studied in the literature review and expanded upon them.

[76] The compositions in general and specifically the development and interrelated practices involved in the composition, recording and performance of *DDK*.

[77] This set of pluralistic relationships is detailed extensively from this current chapter until the end of chapter six

[78] See chapters one and seven for a longer explanation of this idea.

Taps (recorded performances by Impermanence Trio,[79] 2014, Piano Quintet,[80] 2014 and Twelves,[81] 2015)

This piece was inspired by the work of Horace Tapscott (b.1934), the British minimalist composers, William Basinski (b.1958) and the Wadalweiser composers (Wandelweiser, 2018). It asks what is the maximum complexity and coherence that can be achieved with a minimum of written material. The first impression of *Taps* is that it is fairly simple and straightforward piece. The written material is a series of sixteen chords, which last for a bar each. The tempo is slow to moderate. The amount of times that the chords are looped is at the performers' discretion. Because the chords are made up of between 6-10 notes each and the notation includes chord symbols, there are an array of options open to each performer. The notational choices deployed in this piece are quite deliberate and are designed to encourage the performers to make certain musical decisions.[82] There is a deliberate choice to share some compositional responsibility with performers. In the case of the piano quintet, the string players have a limitation placed on them by their instrument's physicality; this defines how many notes they can play as they get to each chord.[83] Harmonically, the choices of the performers can lead to either consonance or dissonance.

[79] Piano: Matthew Bourne, Bass: Riaan Vosloo, Drums: Tim Giles.

[80] Piano: Matthew Bourne, Violin 1: Emma Smith, Violin 2: Aishao Azbayeva, Viola: Rob Ames, Cello: Lucy Railton.

[81] Tenor Sax: Mark Hanslip, Guitar: Rob Updegraff, Bass: Riaan Vosloo, Drums: Tim Giles.

[82] We are reminded of Dubiets definition of Limited aleatory: the implantation improvisatory elements in an otherwise carefully controlled and structured composition.

[83] Double, treble or quadruple stops might be possible – in this recording the strings choose to mainly play single notes.

Of the three versions presented here, the Impermanence Trio and the Piano Quintet versions take on their idioms' respective clothing: arguably, they sound like the training of the musicians playing them. The Twelves version inhabits a different space sonically to the other versions because of the post-production work that has been done. This version of the piece takes samples and sound design elements from the recording, alters them and then adds them back into the mix. The sound design and sampled elements, when combined with the spacious guitar, push this version into an area that is more pan-idiomatic in nature: it is becoming difficult to hear the piece as belonging clearly in a single idiom. This is important to the research overall as one of the aims is to explore a compositional methodology which allows for works to be designed as pan-idiomatic. Furthermore, this version of *Taps* reflects the desire of this research to use technology[84] as a mediating[85] device, which can help create musical environments that are by design pan-idiomatic and conditional.[86] It can be seen as no accident that this version of the piece is one of the first in the portfolio to use technology in its realisation (in this case effects on the guitar, and post-production techniques during mixing).

Arches (recorded performance by Nostalgia 77 and The Monster,[87] 2014)

Arches deliberately uses the chord sequence from *Taps* for the piano solo in section D. With this piece, I set out to explore jump cutting in a similar territory to some of John

[84] Here technology refers to a set of interlinked audio production and post-production techniques which in combination alter the fabric of the composition (when the composition is seen as synonymous with the recording).

[85] Here we are discussing the intervention by a specific set of technologies to resolve and order a set of differences inherent in pan-idiomatic improvisatory spaces and conditional compositions.

[86] And also move into the realms of the total sound-object.

[87] Tenor Sax: James Allsop, Trumpet: Fulvio Sigurta, Piano: Kit Downes, Bass: Riaan Vosloo, Drums: Tim Giles.

Zorn's work, notably *Cobra* (Zorn, 1994). The violent juxtapositions of different sections are of particular significance to the work's structure. *Arches* has a mirror form: ABCDCBA. The piece uses a number of aleatoric techniques, including the specification of pitch but not rhythm and vice versa, ideas which can be found in abundance in many of the pieces of the New York school composers (Cage and Knowles, 1969). Section A is a woozy Tom Waits (b. 1949) style waltz (Waits, 1983). Section B is in a grid diagram (see Fig. 1); this is a compositional technique used throughout the portfolio, as it is an effective way of defining a sonority amongst an ensemble without referencing any specific harmony. These diagrams can be completely diatonic, pan-tonal, atonal and chromatic, and often in the same piece.

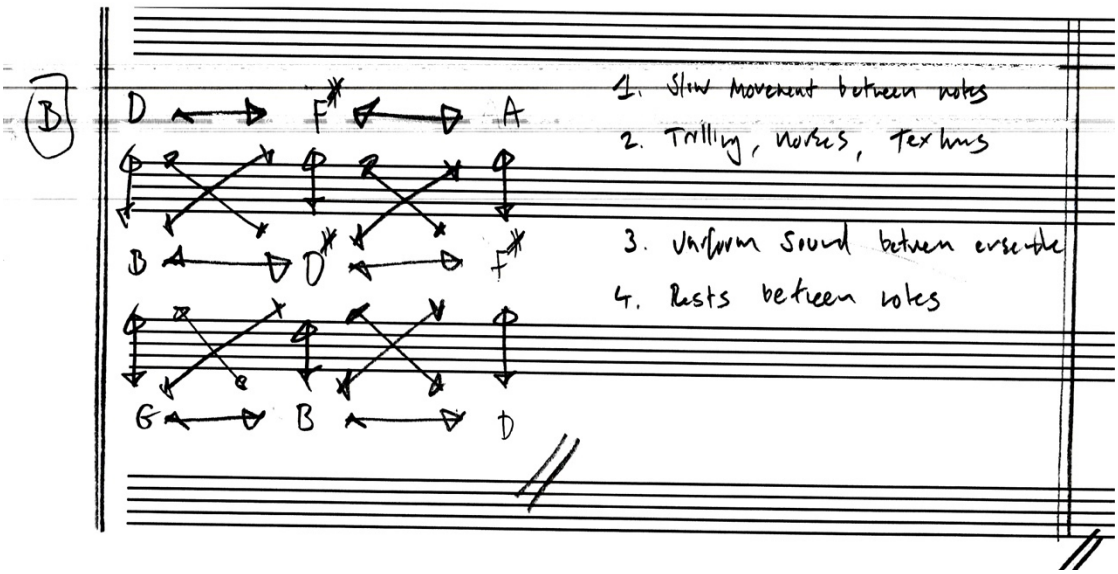


Fig. 1, Vosloo, *Arches*, excerpt (2014)[88]

Section C is a groove with specified rhythms and a tonal area, without specific notes in the notation. Section D is a solo over the chords from the piece *Taps*. Embedding

[88] Please note that this is a scan of a copy of a handwritten (in pencil) sketch score. The image quality reflects this. The complete score of *Arches* can be found in the accompanying hard copies and a digital copy of this scan is included on the USB stick. The reason to include this image here is to hopefully help the reader visualise the notational technique being deployed. With this in mind the gesture and visual of the whole is more important than a specific feature.

pieces within other pieces is an idea that I return to with the reuse and appropriation of material becoming a theme. Indeed, the idea of an artist sampling their own works either as compositional fragments or as audio samples is a useful concept in terms of constructing a compositional continuum. The idea feels natural to me, as audio sampling has been a considerable part of certain areas of my practice (Electric Dr M, 2003 and Examples of Twelves, 2007, 2011). This approach echoes sections of Braxton's most recent work, most notably the pieces that make up *Echo Echo Mirror House* (Braxton, 2013). In this system, Braxton's previous compositions and recordings can all be used to create material for a given performance, this allows for the construction of a vast self-referential assemblage (Colter-Walls, 2016).

Bean (recorded performance by the ensemble Decibel,[89] 2016)

This piece was written for the group Decibel and explores a number of different aleatoric techniques. This was an early experiment with found sound. It recalls the work of William Basinski and Delia Derbyshire (1937- 2001) and is an experiment in musique concrète. The initial compositional process was indeterminate in nature: I made a physical tape loop, then played a Rhodes keyboard onto the tape loop at random, without listening to what I was doing. After recording onto the loop without listening I then listened back to the loop, this process was repeated until the loop sounded fit for purpose. The loop was then transcribed. This led to an unusual bar structure, with a specific polyrhythmic undercurrent.

[89] Artistic director: Ed Bennett, Violin: Mira Benjamin, Saxophones: Neil McGovern, Recorders Michelle Holloway, Clarinets: Jack McNeil, Trombone: Martyn Sanderson, Electric guitar: Paul Norman, Bass: Sebastiano Dessanay, Piano: Eliza McCarthy, Pecussion: Damien Harron.

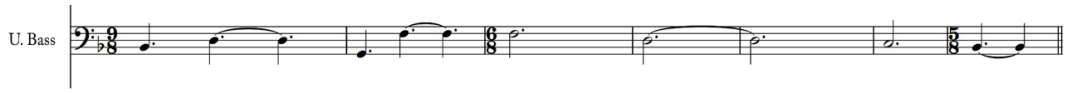


Fig. 2, Vosloo, *Bean*, excerpt, (2013-2015)

I varied this seven-bar structure at certain times in the composition to provide interest and at letter M onwards switched the seven-bar structure rhythmically into a retrograde version. I also added an introduction, which uses a timeline (linear) and also a variation of the grid diagram; pitches are specified but not rhythms. In some respects, *Bean* parallels the approach the piece *Solstice* where a harmonic cloud is developed by aleatoric means and out of that rhythm, form and melody are created. There are two versions of this composition in the portfolio. One is the version discussed above. The other is a version recorded on a Memory Moog synthesiser by Matthew Bourne (b.1977). Both have similarities and differences, but there is a common thread in the way that performers are asked to share some compositional responsibility. I discuss the later version of this piece at length in the Towards a Sound-world section of this chapter.

Algernon and Solstice (recorded performance by Examples of Twelves,[90] 2012)
This is a live recording of two pieces. The first piece is a straight-forward one called *Alright Algernon* (referencing the book *Flowers for Algernon* (Keyes, 1966)). In this instance we play the piece with a South African township feel, similar in style to the performance style of the ensemble Brotherhood of Breath (McGregor, 1969). Once the piece reaches its last section it breaks down into a group improvisation (2.12). Out of this improvisation emerges the piece *Solstice*. *Solstice* uses a variation of the grid

[90] Tenor Sax: James Allsop, Trumpet: Alex Bonny, Trombone: Nat Witts, Piano: Kit Downes, Bass: Riaan Vosloo, Drums: Tim Giles.

diagram technique (see Fig.1 above). In this instance, the musicians can move freely between the first two systems of the first page of the score, but once they reach the third system they must stay there, the third system is the melody of the piece. The effect of this is that the melody emerges from a 'cloud of sound' (5.21). The emergence of the melody acts as a cue for the musicians in the rhythm section to bring in the rest of the written/rhythmic material. The flexibility of the arrangement allows the piece to be different each time. This piece works as a miniature suite that moves from controlled to uncontrolled and back again. The balance of material is important as it allows improvisatory freedom but prevents musicians moving into their personal improvisatory tropes, asking them to engage with the specific language and ontology of the piece.

Conduction No. 7 (recorded performance by Royal Birmingham Conservatoire Creative Ensemble, 2012)

Conduction No.7 is a live recording of the Birmingham Conservatoire Creative Ensemble. My role in this performance is as conductor. The whole piece is composed in real-time, using conduction. The conduction used in this performance is a version based on the methods of Morris, Zorn and Barry Guy (as discussed in the chapter two). This is the only piece in this portfolio exclusively made using conduction. Learning different conduction methods was useful. As a method, conduction allows for the creation of a sound-world through the shaping of larger instrumental forces in real-time. Yet, after using conduction to create pieces, the drawbacks of this approach became obvious. After some time using conduction one tends to know what one is going to get sonically. My experience of conduction is that it is good at large brush

strokes but not so effective when dealing with detail. However, it is a useful approach when contextualised with other compositional methodologies.

Curves (recorded performance by Piano Quintet,[91] 2015)

Curves is a further example, development and variation, of the grid diagram technique. The starting point for this composition was the Cage-ian idea of using the blemishes in a piece of paper to define the pitches to be used in the piece and is similar in some respects to Cages *Variation* pieces (1958-63). It happened that the blemishes allowed a pitch set that was (depending on perspective) a minor pentatonic with an added natural sixth, or a dorian mode with the second omitted. Section A is a series of box notations that performers move through as they see fit: there is control of which box can move to which box. Section B stays within the same tonality but switches what is controlled in each box to a rhythmic control, although pitch is defined but performers can choose which specific pitches to play. Section C is a coda section that organises the pitches into a short chordal section. The performers choose when to move from one section to the next. *Curves*, like *Solstice* shares moves from a disparate set of sounds to something more concrete by the end. This is a sonic representation of something compositionally open and uncontrolled becoming controlled. There are several other versions of this piece in the portfolio, they are discussed in the Towards a Sound-world section later in this chapter.

[91] Matthew Bourne: Piano and Nuntempa string quartet.

No.2 (recorded performance of piano quartet,[92] 2014)

In some ways this piece explores the idea that all music is indeterminate: an idea first put forward by Cage in the book *Silence* (Cage, 1961). Within the fairly straightforward formal structure, you see an exploration of rubato and a tempo. This piece also makes clear that trilling and similar effects are aleatoric in nature, a musical effect/area is being asked for (the trill) but, the specifics (for example, how fast the oscillation of the trill is) are undefined and left to the player's discretion. In some respects, the string parts in this piece foreshadow the compositional ideas that I developed further in the *Line Pieces No.1-6* and *Slide Pieces No.1-5*, which in turn feed forward into *DDK*.

Line Pieces No.1-6 (recorded performance by a string quartet,[93] 2014)

The *Line Pieces* are fairly simple durational pieces and can be considered a set of variations on an idea. Each of the pieces is based around a tonal centre. The performers follow a set of rules to add to or subtract harmonically from this centre. The end result is something that is both tonal and atonal at the same time, perhaps best described as pan-tonal. The pieces are predominantly textural in nature. These have been subsequently made into audio samples and embedded electronically into other compositions in this portfolio, notably *The Black Whole* and *No.5*.

[92] Piano: Kit Downes, Violin 1: Emma Smith, Violin 2: Aishao Azbayeva, Cello: Lucy Railton.

[93] Violin 1: Emma Smith, Violin 2: Aishao Azbayeva, Viola: Rob Ames, Cello: Lucy Railton.

Slide Pieces No. 1-5 (recorded performance by a string quartet,[94] 2014)

In a similar vain to the *Line Pieces,* the *Slide Pieces* are another set of variations on a single idea. Each *Slide Piece* is another example of the grid diagram technique used in the pieces *Arches*, *Solstice* and *Curves* (all included in the portfolio). The *Slide Piece* compositions produce a cloud of sound. As with the *Line Pieces*, I have subsequently turned the *Slide Pieces* into audio samples that have been embedded into other larger works included in this portfolio, notably *The Black Whole* and *No.5*.

Last few days (recorded performance by Nostalgia 77 and The Monster, 2012)

This piece explores a number of different approaches to texture and the compositional surface. The piece explores texture and surface through the use of unusual bar lengths, the juxtaposition of quintuplets and sextuplets, and the movement from duple to triple divisions in the time feel. The improvisational elements in the composition are textural rather than linear, as they are based on vertical rather than horizontal harmony. This also encourages a group improvisatory practice rather than a soloist plus support approach. This piece has a peculiar sound-world and I would suggest that it functions as a total sound-object.[95] The recording and the choices made in the recording and mixing process, alongside the acoustic environment that it was recorded in, have as much bearing on the listener's experience as the musical material. These elements are inseparable in what one experiences as they listen. The production process becomes another set of compositional choices.

[94] Violin 1: Emma Smith, Violin 2: Aishao Azbayeva, Viola: Rob Ames, Cello: Lucy Railton.

[95] See chapters one and seven for a more in-depth analysis of this term.

Personal Growth (recorded performance by Twelves, 2015)

Personal growth shares some of the same compositional concerns as *The Last Few Days*, notably the idea of different compositional 'surfaces' sitting alongside one another and creating musical interest through their juxtaposition. The difference between the two is that the improvisation in *Personal Growth* is harmonically linear. The other key difference is that *Personal Growth* is through-composed. The composition moves through composed and improvised sections that are related but different, yet there is still a feeling of completeness. This piece references the work of Tim Berne (b.1954) notably the album *Saturation Point* by Bloodcount (1997) and Julius Hemphill (b.1938) particularly the album *Dogon. A.D* (1977).

Forest (recorded performances by the Impermanence Trio, 2014, solo piano, 2014 and string quartet,[96] 2015)

This is a heavily notated composition, which is approached differently by each of the ensembles that performed and recorded it for this submission. Many compositional decisions were taken in the studio to solve specific performance issues. In each recorded version the recording differs from the score in significant ways. For example, The Impermanence Trio had trouble with some of the written material (they were sight reading); to solve this problem, the problematic written material was removed, and this meant that we could complete the recording of the piece within the restrictions of the allotted time. When recording the string quartet version (who had rehearsed) they too-easily reverted to obvious improvisatory gestures when playing the sections of the piece that called for improvisation. Because of this, one of the improvisation sections was replaced in favour of a short global compositional gesture:

[96] Piano: Matthew Bourne; and the Nuntempa string quartet.

Section G in the score is replaced in the string quartet recording with a two-bar violent upward glissando. The fact that there are 'jazz versions' and 'classical versions' of this tune underlines the binary thinking displayed during the initial stages of this research.

Today, Today… (recording of performance by the Impermanence Trio, 2014)

Today, Today… is a piano trio improvisation. As with the piece *Henry Foxwood Goes to Town*, *Today, Today…* displays a great deal of musical cohesion. This is in no small part down to the longstanding relationships of the performers to one another. Relationships which have been developed over a period of years. These relationships are integral to the establishment of a group vernacular. The piece was recorded as part of a research project carried out at the University of West London by Jonty Stockdale. The aim of the research project was to investigate the way in which improvisers interact visually. In the case of the Impermanence Trio it became clear that we did not communicate visually at all. Visual cues in this context are unnecessary as much of the negotiation needed for musical understanding between the members of the group was carried out years ago through continued performance with one another. By performing regularly with each other in multiple contexts we developed a shared musical practice. Due to a shared musical practice and a shared set of musical vernaculars any communication, other than musical communication (that is we can say what we need to with our instruments as we make music together), is entirely unnecessary.

One of the most striking things for me about this recording, in relation to this research, is the way that it sounds. It was recorded using a stereo dummy head in a spacious

room (the reverb is natural). I would suggest that the combination of this recording technique (the dummy head), combined with our use in performance of both standard and extended techniques, leads to something approaching what I characterise as a total sound-object.[97] As Durkin points out, the environment and recording methods add as much to the music as the performance, and often these extra musical events can become integral musical elements which mark a deeper contextual collaboration (2014, p. 101).

Henry Foxwood Goes to Town (recorded performance by sax trio,[98] 2013)

This piece is a saxophone trio improvisation. Because of the longstanding musical and personal relationships of the performers, the piece reaches a level of cohesion that places it on a par with the composed elements of this portfolio. My participation in performances like this led me to the idea of being able to incorporate cohesive improvisatory performance within a larger formalised (composed) structure. In some respects this is one of the key goals of the main output of this research, the piece *DDK*. In the case of this research it was technological solutions which provided a mediation between improvisatory practice and performance, and larger formalised structures.

[97] See chapters one and seven.

[98] Tenor Sax: James Allsop, Riaan Vosloo: Bass, Tim Giles: Drums.

3b) ***Towards a sound-world (electronic pieces)***

The ten pieces[99] in this section seek to explore sound-worlds and the ontologies that those sound-worlds create.[100] They also seek to explore some processes, which allow electronic/digital works to be constructed in a multiplicity of ways. These pieces follow on from the previous pieces, in so far as they are conditional but the way that they are deliberately situated and conceived might move them far more towards the total sound-object.[101] This is in no small part down to both a consideration of, and the practical application of differing technologies.[102]

Tape Loop One (recorded performance tape loops, delay and string quartet,[103] 2014)
This is another piece written using the same tape loop as was used to compose *Bean*. This is a piece for tape loop, strings and delay; it is more textural in nature than *Bean*, as I applied far less compositional method to its shaping. In some respects, it is purer in its indeterminacy, in so far as the 'I' of myself as composer was more removed from the process of composition.

Lost People (recorded performance by Examples of Twelves, 2011)
This was an early experiment with a tone row (although the row is incomplete and not manipulated). The trumpet states the row at the beginning of the piece solo. There then follows an early grid diagram section similar in conception to *Solstice* (see Fig.

[99] Listed at the beginning of this chapter.

[100] For an in-depth exploration of sound-object, sound-world and the ontologies of those concepts see Schaeffer (1951 and 1966), Kane (2014) and Faustini (2016).

[101] See chapters one and seven for a longer explanation of this idea.

[102] Here we are referring to specific audio and production technologies which shape and change sound.

[103] Tape loops and delay: Riaan Vosloo, Violin 1: Emma Smith, Violin 2: Aishao Azbayeva, Viola: Rob Ames, Cello: Lucy Railton.

1). The other players are provided with polytonal pitch sets, but that is all they are given. All other musical information is for them to decide. Fragments of the row/melody act as musical cue to move to the next section. At section E, the rhythm section enters; this is the pivotal moment in the composition, as the intention is to cause a perceptual shift in the listener. The composition moves from something, which resembles a piece of pointillist contemporary classical music, to sounding like *Bitches Brew* (1970). The fact that this pivot in perception occurs from the rhythm section is significant because it suggests that it is possible to reconceptualise a composition by changing the foundations that it is built on. The melody/row previously stated freely now returns in time/meter. I also decided to overdub a Rhodes part to add to the *Bitches Brew* feeling, the sound of the Rhodes having a strong sonic link to this era.

Bean (recorded performance solo Memory Moog,[104] 2015)

There are two versions of this composition in the portfolio. They are quite different in nature. One is discussed earlier in this chapter; Matthew Bourne recorded this second version on Memory Moog. Bourne played each line of the original score and built up a multi-track version of the piece. This approach mirrors the work of both Wendy Carlos (Carlos, 2018) and Suzanne Ciani (Ciani, 2018). Carlos in particular developed an approach to playing classical pieces on analogue synth, notably in the soundtrack to *A Clockwork Orange* (Kubrick, 1971). This version of *Bean* reflects a new direction in my compositional approach to the research: the synthesiser opens up a new sound-world. With hindsight, it is clear that the electronic element of the music played a notable part in contributing to the sound-world of *DDK*.

[104] Matthew Bourne: Memory Moog synthesiser.

Curves (recorded performance, solo Memory Moog,[105] 2015)

Curves represents a similar approach to that taken with *Bean* but there are two Memory Moog versions of the piece which are subtly different: one has a 'bells' sound and the other with a 'string' sound. With both *Bean* and *Curves,* it was interesting and enlightening to see how easily and authentically the pieces moved between genres. There seemed to be a particular sonic affinity between strings and synths. I am not the first person to have seen a link between strings and electronics, although in this instance the relationship is reversed (the relationship is a two-way street). Jonny Greenwood in an interview about Penderecki says:

> Penderecki was talking about how he used to study electronic music in Warsaw, and I think he realised that all these electronic sounds could be made with an orchestra, or could be done better and developed with an orchestra, so he turned his back on the electronic stuff and went instead to an orchestra (Greenwood in Sweeting, 2012, Online).

This quote would seem to illustrate that for Penderecki, the results of electronic and acoustic sound production where getting closer and closer together, and in his practice at least, where becoming interchangeable.

[105] Matthew Bourne: Memory Moog synthesiser.

Curves (recorded construction/performance two memory moog and string quartet[106], 2016)

As neither the string quartet version nor Moog version or *Curves* completely matched up to my compositional expectations, I decided to construct a version of the piece from all three sources. I Digitally manipulated the musical-data files and utilised various electronic editing processes to integrate the different versions so that they sit together as a complete piece.

No.3 (recorded performance: laptop, piano and string trio,[107] 2013)

This composition is an early attempt to integrate live laptop interaction into performance with acoustic instruments. The drone element of this composition works well; this composition also deploys another variant of a grid diagram (see Fig.1) in several sections: the attempt in these sections is to integrate the drone and electronic sounds from the laptop audio source with aleatoric gestures generated by the grid diagram which the acoustic instruments play. The rest of the composition I judge unsuccessful because the sections do not gel and there is no compositional link between the acoustic and electronic sounds. The piece also suffers from an unintentional feeling of 'aimlessness'.

[106] Piano: Matthew Bourne; and the Nuntempa string quartet.

[107] Piano: Kit Downes, Violin 1: Emma Smith, Violin 2: Aishao Azbayeva, Cello: Lucy Railton, Riaan Vosloo: Laptop.

No.4 (recorded construction/performance computer, sampler and drums[108], 2011-2017)

This is a piece that samples both a recorded work by the composer Palestrina and a recorded free jazz session (in which I was playing, dating from 2005). The work is 'non-temporal' (in the sense that the constituent musical elements do not originate from the same synchronous time point). Recorded sound allows one to make pieces which have elements that are not only recorded continents apart, but also years apart in terms of their origin – [both in terms of the recording itself and the compositional notation]; this approach reflects the compositional practice which Braxton has recently been exploring in *Echo Echo Mirror House* (2013). Sonically the piece is influenced by Shakleton's *Three EP's* (2009). The drums were improvised and recorded in the first take. This is a practice derived from the *Dogme* approach to recording, which we developed in the *Electric Dr M* (2003).

No.5 (recorded construction/performance laptop, guitar, bass and drums,[109] 2014-2017)

This piece was prepared in a similar way to the second Examples of Twelves record (*Things Will Be*, 2007). Musicians were presented with a recording of an electronic score to which we improvised. I then destroyed any part of the original electronic score and re-shaped the piece using a computer, adding to and manipulating the sounds which had been recorded. As well as writing a short melody for the end, I also added and embedded one of the *Slides* pieces into the introduction. This was another example of a conscious decision to use audio samples of my own previous works, as

[108] Riaan Vosloo: Laptop, sampler and Bass, Tim Giles: Drums.

[109] Riaan Vosloo: Laptop and Bass, Rob Updegraff: Guitar, Tim Giles: Drums.

compositional sonic building blocks for new works. The sound-world which *No.5* and the *Black Whole* share became increasingly important when considering the sound-world of *DDK*. It is important to note that the sound-world of both *No.5* and the *Black Whole* were built by manipulation of the recordings after the fact. The question that started to present itself, was how could one compose in the sound-world of these pieces, achieving a similar aesthetic space, but in real time?

The Black Whole (recorded construction/performance piano, laptop, guitar, bass and drums,[110] 2014-2017)

In many ways, *The Black Whole* is the culmination of the sound-world preparatory pieces, as it incorporates a number of different elements, which were developed in some of the previous preparatory works. As with *No.5*, I presented the musicians with an electronic score to which we improvised. I then removed any parts of the original electronic score (though some of the original score remains from 7.14-8.30). *The Black Whole* also has one of the *Line pieces* embedded within it as an audio sample. Bourne improvised his piano part over the pre-existing recording again using the *Dogma* recording technique developed in the *Electric Dr M* (2003).

The recorded pieces *Black Whole*, *No. 4* and *No.5*, originate from the same performers. The combination of their personal practice and 'sound' contributions to the pieces adds dramatically to the sound-world which was achieved. It was this sonic landscape which I would explore when building/composing *DDK*. The sound-world pieces were shaped by adding and subtracting elements and by use of strategic production decisions. These decisions are compositional in nature. Just as when you

[110] Matthew Bourne; Piano, Riaan Vosloo: Laptop and Bass, Rob Updegraff: Guitar, Tim Giles: Drums.

orchestrate and arrange, when you produce, you are dealing with musical colour (timbre), blend, form and melody. The process of writing the preparatory pieces led me to want to combine the freedom of the improvisatory and conditional pieces, with the formality of the composed pieces. To embed those concepts inside the sound-world that we/I had reached, hopefully leading us towards the creation of total sound-objects. As this seemed to be a conceptual area that would allow the exploration of my initial research questions.

3c) ***Structure, collaboration and technology***

After writing the preparatory pieces and studying the available literature it appeared that some kind of visual control mechanism, similar to the systems deployed by the real-time notation composers discussed in the literature review, might be the way to organise and explore my compositional ideas. It was also intended that this would help this project to explore the research questions. As the literature review shows, many real-time notation pieces are short in length, and are concerned with the process of image and score generation. For this research, more space was needed for melody, thematic compositional development and pan-idiomatic improvisation. These elements would be important for the cohesion of a large form piece and help to address the research questions in detail. It seemed there may be a way to combine all of the above under the umbrella of real-time notation. To achieve a clear and well defined technological/visual interface it was apparent that a personal visual language was going to be necessary, with potential influence from the painters and visual artists examined in the literature review. Collaborating to realise certain elements of the project was also going to be important, not least the process of working within a computational processing environment. Collaboration with performers was needed to

articulate the visual language, which was a necessary part of this project. A further consideration was the organization of sound in a compositional way, to encompass the sound-worlds of the preparatory pieces with the most successful compositional elements of those pieces. At the same time as organizing and composing within a sound-world, I wanted to maintain the collaborative freedoms of what I consider the most exciting elements of a certain type of music, that is, music which is co-owned by the participants. As well as a technological interface, the idea and organization of conditional and mobile music was to be another key ingredient for the development and realization of the large work; initially it was considered that this could be achieved through game or conduction methods. However, the idea of a conductor or prompter (speaking as it does of a composition and performance hierarchy) was at odds with the collaborative and improvisatory aesthetic of the project. It was seeking solutions to a combination of all the above points that led to technology as a unifying force within the research, influencing: ensemble selection for the main output; compositional design; the framework for the realization of the main piece in the form of *DreamSampler*; and the performance practice associated with the main piece. Furthermore, an attempt was made to begin to formalise a way of discussing the conceptual and theoretical frameworks which underpinned the project (the notion of the conditionally finished piece and the total sound-object).[111]

Before work could begin on systematically developing the deployment of different technologies and related practices, some compositional materials were needed. The development of these materials is discussed in the next chapter.

[111] Both concepts are discussed in chapter one and at length in chapter seven.

Chapter 4: Methodology and Project Activity Two:

Developing *Dreams of a Delinquent King*

This chapter discusses the methodology used to compose the pieces/sections: *Ides (Dream Five) Lady M (Dream Six), Dream One*, *Dream Two*, *Dream Three* and *Dream Four*. These six pieces/sections when combined within framework of the *DreamSampler*[112] become the conditional piece *DDK*. The main thematic material for *DDK* was developed concurrently with the development of the *DreamSampler*. Initially the pieces *Ides (Dream Five)* and *Lady M (Dream Six)* were composed using a combination of fairly standard practice notational and composition techniques.[113] The pieces *Dream One* and *Dream Two* are deconstructions and developments of *Ides (Dream Five)* and *Lady M (Dream Six)* respectively.[114] This chapter also discusses the collaborative development of the animated graphic score pieces *Dream Three* and *Dream Four*.

It should be noted that as with the preparatory pieces, *Ides (Dream Five), Lady M (Dream Six), Dream One*, *Dream Two*, *Dream Three* and *Dream Four* share a desire to explore what can be best described as the 'meta' element of notation. During the writing of these pieces an understanding how different notations, schema, absences and additions elicited different responses from performers was key. Choices were consistently made to notate[115] or develop performance schemas in certain specific

[112] See chapter five.

[113] During the submitted performance these sections of the piece were still performed using standard notation.

[114] The digitisation and animation of these pieces is discussed in chapter five.

[115] Either traditionally, graphically, box, animated, real-time or combinations of these.

ways. These choices have been made in a deliberate and controlled way, with other notational and/or schematic options being disregarded as they did not/could not achieve the desired sonic, compositional or performative effect. It is hoped that through this chapters detailing of the development and specific compositional practice deployed in writing *Ides (Dream Five), Lady M (Dream Six), Dream One*, *Dream Two*, *Dream Three* and *Dream Four* that their relationship to 'meta' notations becomes clear. It is also hoped that the deliberate nature of specific compositional decisions made during the composition of these pieces is also made clear. Furthermore, it is hoped that when this current chapter is considered alongside viewing or listening to *DDK*, further deliberate notational and compositional choices can be observed.

4a) *Ides (Dream Five)*

Ides (Dream Five) was the first piece written during this project that was both designed to be and became part of the main work, *DDK*. Once integrated into the large form of *DDK,* this piece/section can be thought of equally well as *Dream Five.*[116] As discussed later, in both this chapter and the next, the transformation and digitisation of the piece, as well as the relationship *Ides (Dream Five)* has with the other sections within *DDK* intend to show that it is a fully integrated part of that larger piece.[117] Initially this piece was conceived after reading an interview with Gunther Schuller (Iverson, 2016, Online). In this interview, Schuller discusses what he describes as his magic row, and how this row within his own practice helped to free him from some of the orthodoxies surrounding twelve-tone writing. Alongside Schuller, I had been

[116] See chapter five.

[117] And that there was a clearly considered and articulated set of notational practices.

studying John O'Gallagher's *Twelve Tone Improvisation* (O'Gallagher, 2013). Feeling at a compositional loss, it seemed sensible to see if a hybridised twelve-tone system might spur some compositional work. A decision was made to try, and develop, a motif which recurred often in my compositions and improvisations:

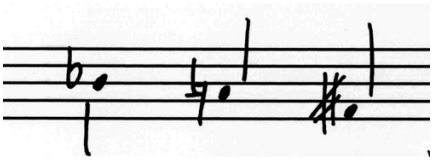


Fig.1, Vosloo, *Sketch 1*, excerpt, (2015)

This motif has to a high level of significance for me musically, as I have used it for many years in multiple contexts. There is no reason for this other than it is appealing aesthetically. It became obvious that it could be developed well into a row. This motif is also the main melodic idea in the preparatory piece *The Black Whole*. It can be heard at the beginning of the piece, at around the 6.30 mark and again at the end. At this point it might be prudent to point out that the intention was not to make a pure twelve-tone piece, but rather to use some concepts from that system to spur creation. Below I refer to pure and non-pure rows. The pure row follows the rules of twelve-tone writing: all twelve notes are expressed before any repetition. The non-pure row refers to a row where repetition of notes does occur. However, the row is still made of discrete tri-chords and hexachords. Below (and included in the portfolio as hard copies) we can see some initial sketches. From the initial three-note motif, two rows (one non-pure and one pure) are derived. From the first hexachord of this row, I derive two tri-chords which I turn into a rhythmic motif.

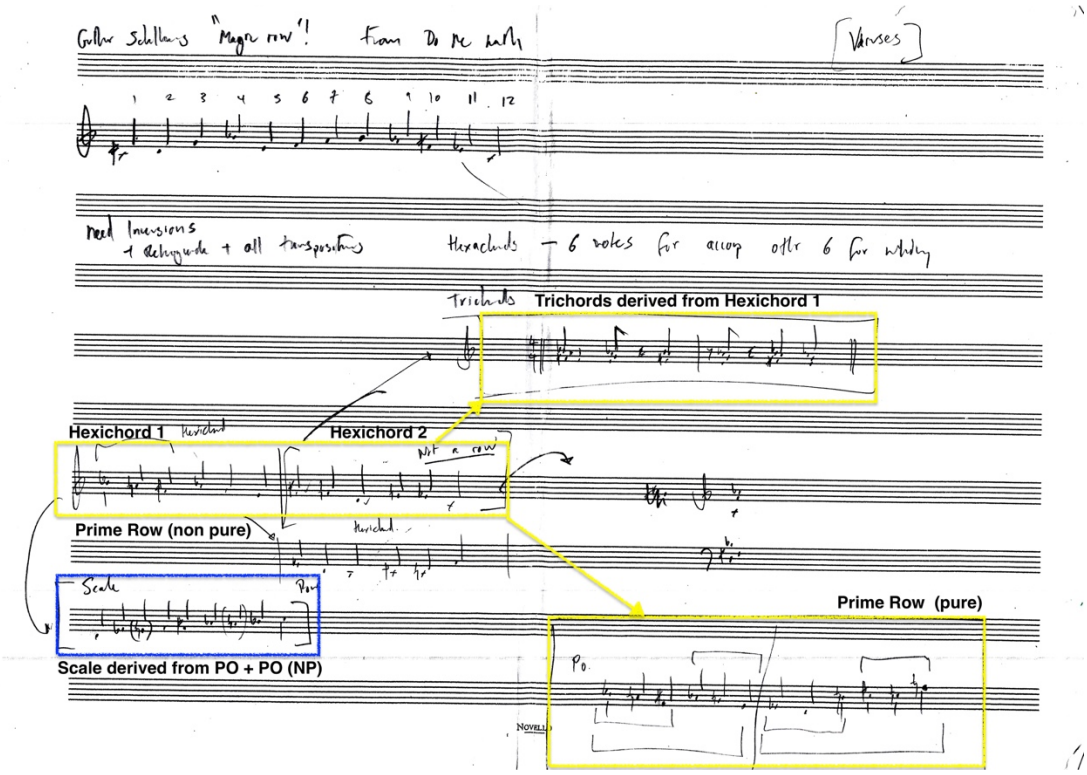


Fig.2, Vosloo, *Sketch 2*, (2015)[118]

Below we can see the PR0(NP) as well as the PR0 we also see PR10 and an exploration and development of tri-chords.

[118] Please note this is a scan of a pencil sketch, which has been marked up to point out key compositional and notational devices which have moved from the sketch to *DDK*. If the quality is an issue please see the copy included on the USB in Scores:Delinquent King fragments/sketches: Ides (Dream five): Ides annotated.

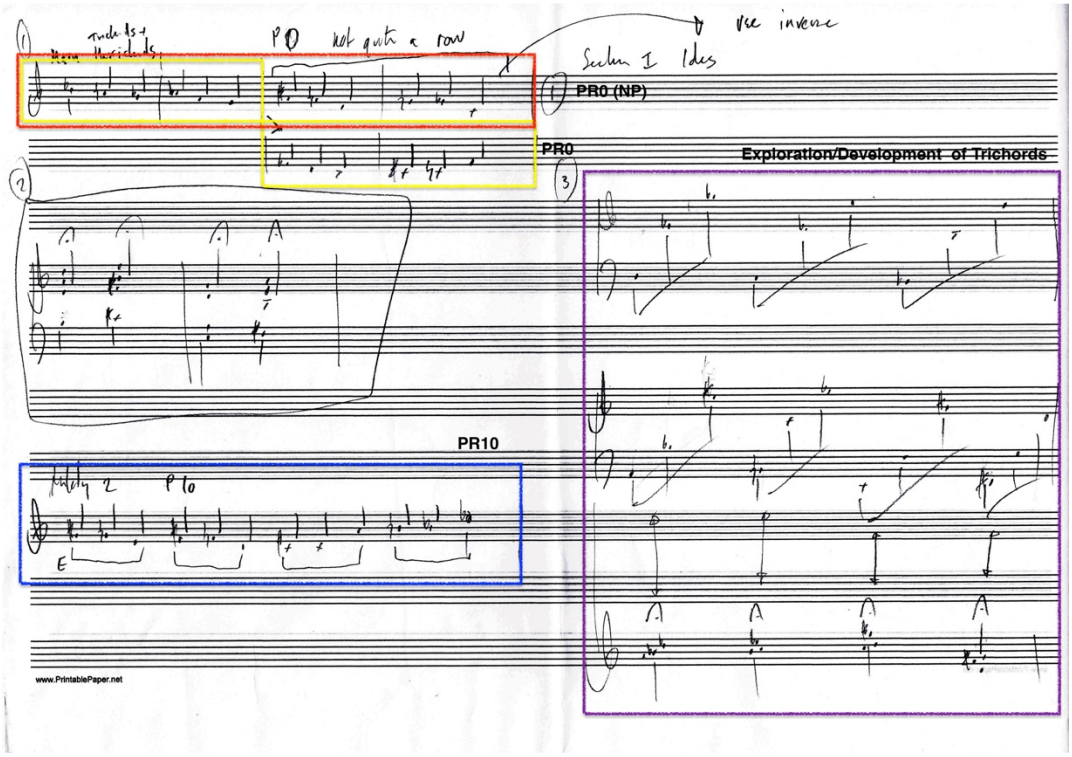
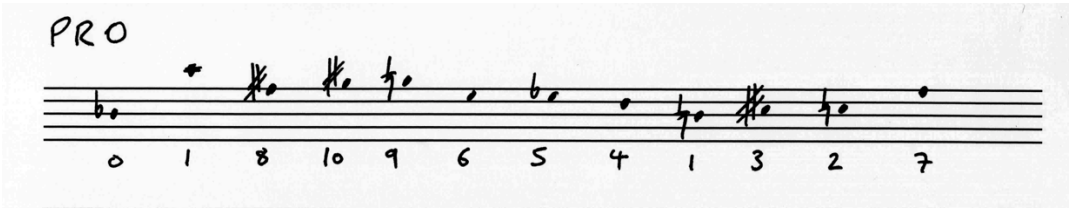


Fig.3, Vosloo, *Sketch 3*, (2015)[119]

Using the notation software Sibelius, I created all possible versions of the Row.

The key Rows that I ended up using were:[120]

PR0

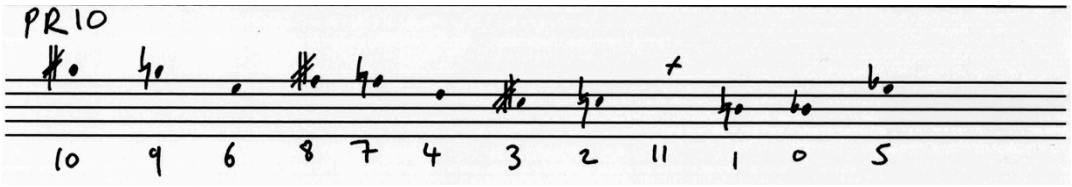


And the variant PR0 (NP) (see above on sketch)

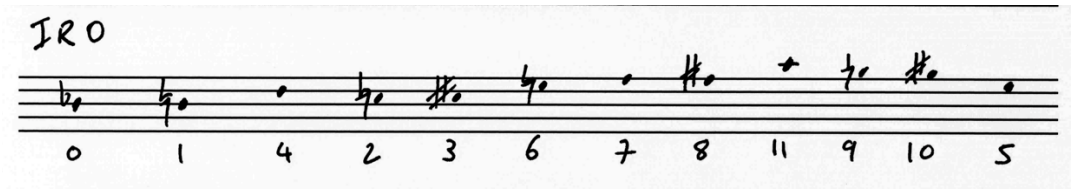
PR10

[119] Please note this is a scan of a pencil sketch, which has been marked up to point out key compositional and notational devices which have moved from the sketch to *DDK*. If the quality is an issue please see the copy included on the USB in Scores: Delinquent King fragments/sketches: Ides (Dream five): ides 2 annotated.

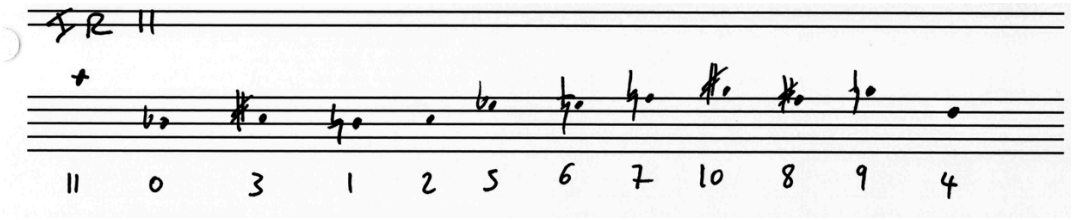
[120] Please note these are edits of a scan of a pencil sketch. It is hoped that the intention is clear enough from these images.



IR0



IR11



These rows became the primary building blocks for the piece *Ides (Dream Five)*, which then formed a part of the larger piece *DDK*. Whilst the melodic and some harmonic material of the piece is, in part, derived from twelve-tone techniques, these techniques are used in conjunction with many other compositional processes.

The role of the bass instrument is significant in this piece as the bass part provides the tonal gravity - because of the bass, the piece essentially becomes modal in nature. A modal approach similar to John Coltrane, in which chromaticism can abound, but there is a centre/s of tonal gravity.[121] It may well be that the twelve-tone writing when contextualised by the tonal gravity of the bass is perceived as chromaticism. It could be argued that the twelve-tone writing provides something slightly more musically

[121] For a definition of tonal gravity and how it relates to bass figures see Jost (1994, pp. 84-120).

architectural to the piece as it allows a controlled construction of the micro up to the macro.

The piece uses seven main motifs and has three main themes that are all interrelated. Indeed, the motifs are slotted together in multiple ways to produce material similar to a moving tile game or rich textured quilt. Another initial sketch is available (see hardcopy in portfolio); this shows what has become section B in the score. This piece is where the secondary theme comes from, as well as the quite ambiguous chords.

The rationale for developing a hybridised musical language which continually borrows from multiple traditions was to encourage the musicians (all of whom are from an improvising background) to engage with the piece on its own terms, and not fall back on tropes associated with specific idioms and styles. This was an integral driving force to this research and is linked with the notions previously mentioned about the conditional nature of these pieces.

The form of *Ides (Dream Five)* is as follows:

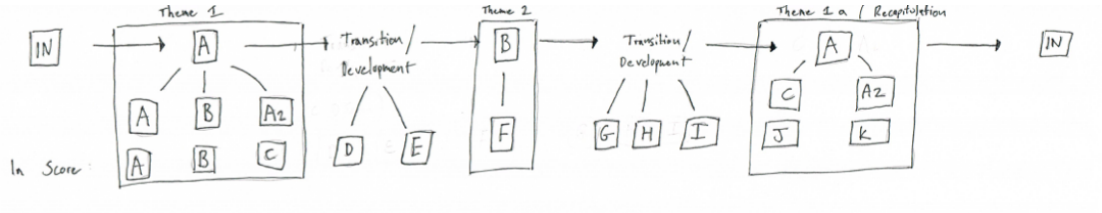


Fig.4, Vosloo, *Ides (Dream Five) form sketch*, (2015)

It is worth discussing each of these sections as sub sections in further detail. Most of the melodic material is made up of a set of motifs (I will refer to them as M1, M2, M3 and so on).

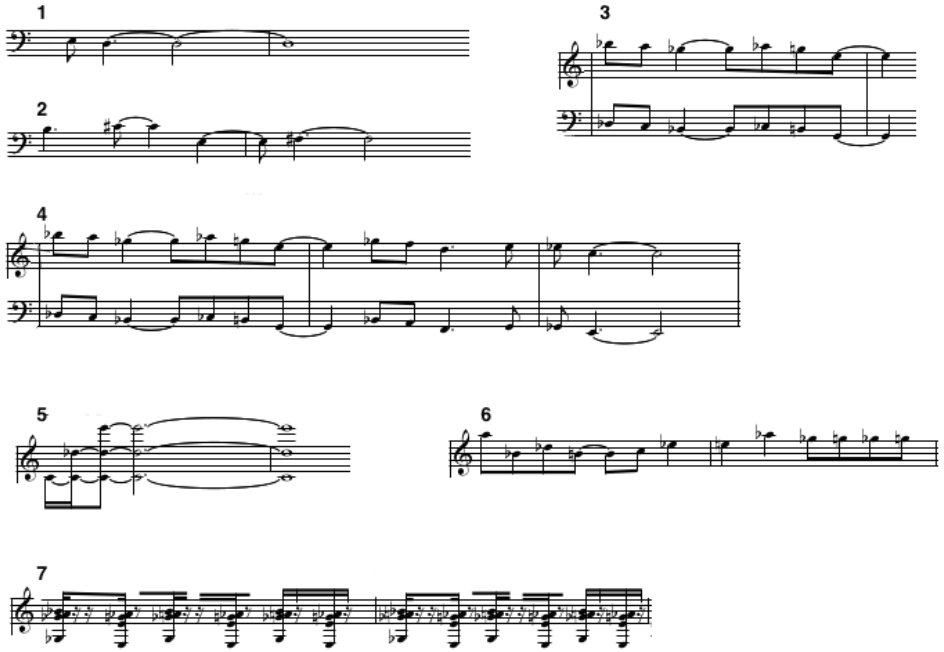


Fig.5, Vosloo, *Ides (Dream Five) motifs*, (2015)

These motifs are derived mainly from the rows seen earlier - there are a couple of exceptions.

M1 is derived from an initial musical sketch, which now forms the **B** section of the piece (see hardcopy in submission).

M2 (and variations) is a musical reference to an earlier piece of mine called *The Way Things Are* (Examples of Twelves, 2007).

M3 is the first hexachord of P0.

M4 is P0 (NP).

M5 is an example of a tri-chord exploration (derived hexachord 1 P0).

M6 is IR11.

M7 is a rhythmic gesture derived from the two tri-chords that make up the first hexachord of P0. **M7** is a re-expression of **M5**.

There are two other key melodic compositional points. **M8** happens in section F and is one of the main themes of the piece. This material is all derived from PR10

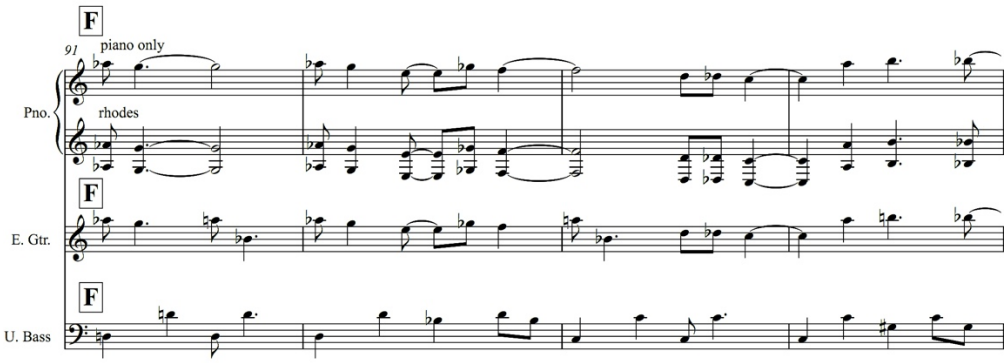


Fig. 6. Vosloo, *Ides (Dream Five)*, excerpt, (2015)

Section J is a development and combination of **M4** and **M5** and is therefore a combination of P0 (NP) and tri-chord gestures derived from P0.

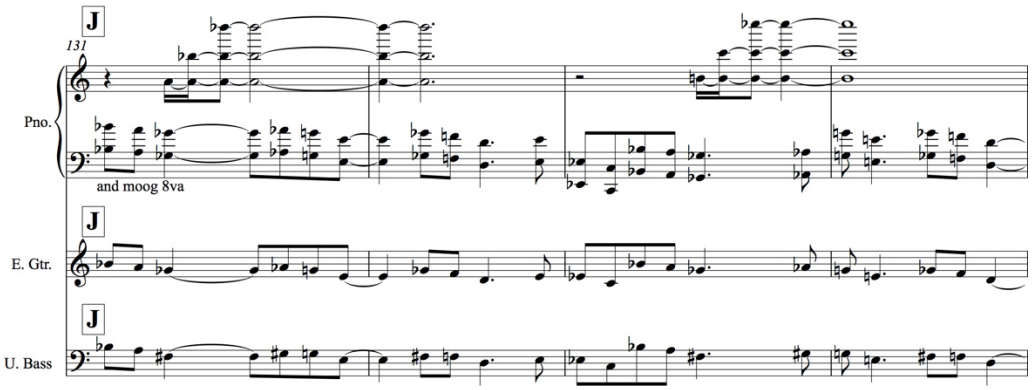


Fig.7, Vosloo, *Ides (Dream Five)*, excerpt, (2015)

Further examination of the form is revealing about the nature of the melodic content.

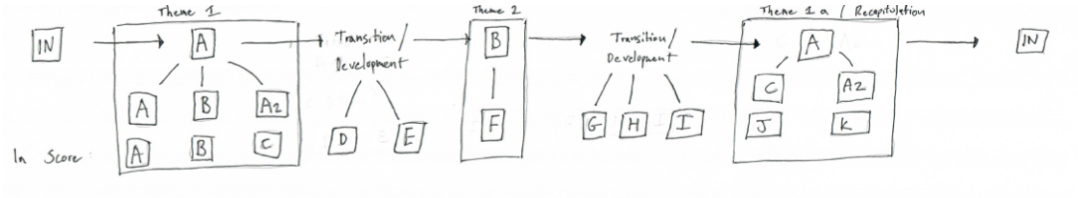


Fig.8, Vosloo, *Ides (Dream Five) form sketch*, (2015)

IN is the introduction - here there are targeted thematic samples (glitches and reversed drums) these have a specific compositional purpose, which is that they act as an aural theme, and in some ways act formally like a melodic idea. They also set up a mood and act as connecting tissue when performed as part of the larger work *DDK*. The same targeted thematic samples return at the end of this piece/section.

Main A - (in totality) Theme 1 (Tonal centre of D)

A1 = (M 1,2,1,3,2) + **B** (M 1,4,1,2,1,2) Melody 1

B = (see appendix) Melody 2 (some harmonic movement deliberately ambiguous-related implied harmony in **P0** + **P0 (NP)**)

A2 (**C** in score) = **A** (M 1,2,1,3,2) + **C** (M 1,2,1,4) Melody 1 (variation)

Transition/Development 1

D = Piano solo, return of thematic samples from **IN (Tonal centre D)**

E = (M5) creates tension + (M6) acts as a transition to **F** (Harmonic movement via whole tones D,C,Bb, Ab)

Main B - Theme 2 (Harmonic movement via whole tones D, C, Bb, Ab)

B (**F** in score) = (M 8,7,5,7,6,8)

Transition/Development 2 (Tonal centre Bb)

G = Guitar solo

cued (M 7,5,7,5) transitional

H = Continued transition (M 7,6)

I = Thematic material (M 5,2,5,3,5) **(Tonal Centre A)**

Main A2 - (in totality) Theme 1 (recapitulation with variation) **(Tonal centre of D)**

C (**J** in score) = (M4+M5), transformation of material from Melody 1

A2 (**K** in score) = **A** (M 1,2,1,3,2) + **C** (M 1,2,1,4) Theme 1 (variation)

IN - Recapitulation of electronic material, some in retrograde.

As stated earlier, the harmonic crux of this piece is that it is essentially modal. It stays in the Tonal area of D pivoting in a tertiary motion to Bb via whole tone movement in the second transition/development section. The primary reason for the modal nature of the piece is the fact that PO in both its forms was particularly suggestive of the scale below:

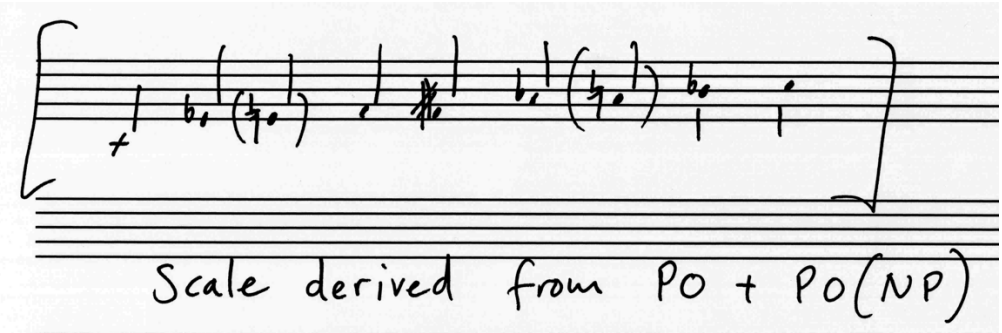


Fig.9, Vosloo, *Sketch 1*, excerpt, (2015)

This is close to what can be described as an altered scale, which is itself the 7th mode of Eb melodic minor. *Ides (Dream Five)* does not in any way conform rigidly to this (it is the tonal gravity of the bass which is responsible for suggesting tonal centres). However, there is an important link here to the second standard notation piece *Lady M (Dream Six)* in that both pieces use the same harmonic starting point (a loose interpretation of the above scale) but distort and re-contextualise this material in differing ways. There are enough similarities between the two pieces that once inserted into the larger canvas of *DDK* they act as intended as thematic fixed points. It could be seen that this is, in no small part, down to their shared compositional lineage. In many ways they act as cousins within the context of the extended work *DDK*.

A further conceptual link can be seen between *Ides (Dream Five)* and *Lady M (Dream Six)* and that is in the use of hockets. This was considerably more conscious in *Lady M (Dream Six)*, particularly in the A section melodies.

A1 = (M 1,2,1,3,2) + **B** (M 1,4,1,2,1,2) Melody 1 and

A2 (**C** in score) = **A** (M 1,2,1,3,2) + **C** (M 1,2,1,4) Melody 1 (variation)

It is possible to imagine a rearrangement of the motifs into a single melodic line, rather than being divided up between the instruments. In the present arrangement, the motifs change and develop throughout the piece. The soloists were deliberately given limited harmonic information. I believed that they would respond to the wider musical language of the piece if specific harmonic information was withheld. In part, the solos should not be considered 'solos' as such, but a development of and contribution to a larger sound-world, a sound-world that was created in the main by integrating this piece into a larger whole.

4b) *Lady M (Dream Six)*

Lady M (Dream Six) was the second piece written during this project that was both designed to be and became part of the main work *DDK*. It was written shortly after *Ides (Dream Five)*. Once integrated into the large form of *DDK,* this piece can be thought of equally well as *Dream Six.*[122] Indeed, as discussed later in both this chapter and the next, the transformation and digitisation of the piece, as well as the relationship *Lady M (Dream Six)* has with the other sections within *DDK,* hopefully shows that it is a fully integrated part of that larger piece.[123]

[122] See chapter five.

[123] And that there was a clearly considered and articulated set of notational practices.

In some respects, *Lady M (Dream Six)* is a simpler compositional proposition than *Ides (Dream Five)*. Below we can see the initial sketch for the piece. The initial gesture is essentially three groupings of thirds over a cluster chord. This gesture is quickly expanded and developed into Theme 1 and Theme 2. Furthermore, an implied tonality is also established/suggested; a D alt tonality which is the seventh mode of Eb melodic minor. This is the same tonality as *Ides (Dream Five)*. This was initially coincidental, but later, the shared tonal centre of *Lady M (Dream Six)* and *Ides (Dream Five)* became central to *DDK* working as a complete piece.

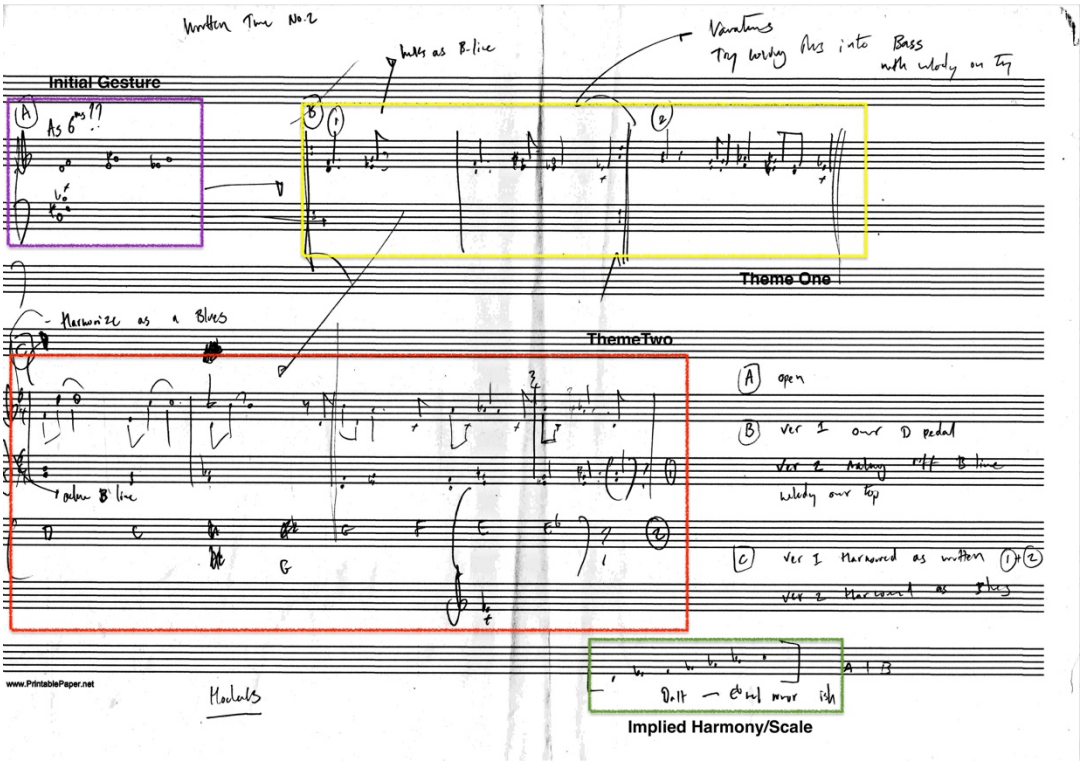


Fig.10, Vosloo, *Sketch 4*, (2015)[124]

Within the finished composition, Theme 1 is mainly presented as a hocket with the top and bottom of the thirds displaced against one another, the thirds are often inverted

[124] Please note this is a scan of a pencil sketch, which has been marked up to point out key compositional and notational devices which have moved from the sketch to *DDK*. If the quality is an issue please see the copy included on the USB in Scores: Delinquent King fragments/sketches: Lady M (Dream Six): Lady M rough main annotated.

into sixths. I found that there was a lot of compositional mileage from using this chord displacement as it made what would have otherwise been a slightly plain melody musically more interesting. Theme 2 could then be presented as a more direct unison melody.

The form is a modified AABA form.

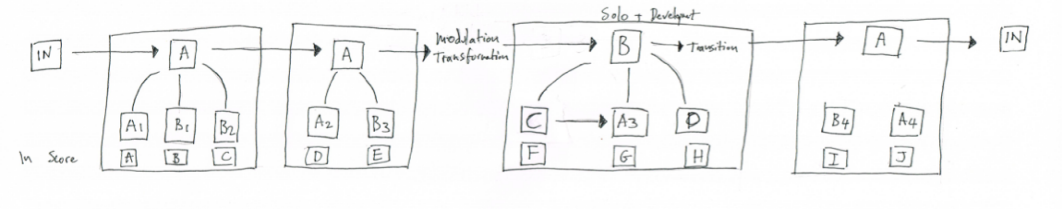


Fig. 11. Vosloo, *Lady M (Dream Six) form sketch*, (2015)

IN - The introduction - as with *Ides (Dream Five)*, in *Lady M (Dream Six)* there are targeted thematic samples (glitches and reversed drums) that have a specific compositional purpose and act as an aural theme. They also set up a mood, and act as connecting tissue when performed as part of the larger work *DDK,* and the same targeted thematic samples return at the end.

MAIN A1

A1 hocketed Theme 1 Dalt tonality

B1 Theme 2 - Subdominant tonality of G (although because of the deliberate harmonic ambiguity of the piece, this can feel like the Tonic).

B2 (C in score) As **B1** with variation of orchestration.

MAIN A2

A2 (D in score) As **A1** with variation of orchestration.

B3 (E in score) As **B1** with variation of orchestration.

At the end of **B3** we modulate to an unstable C tonality - this is achieved by the constant movement in the bass and guitar parts between a major sixth and an

augmented 5th. The modulation suggests tertiary movement (another harmonic facet that this piece shares with *Ides (Dream Five)*). We move from G to C via E7. The modulation to C from G also plays on the tonic/subdominant ambiguity, which has been set up between the **A**, and **B** sections. **C** is quickly established as our tonal centre.

At the same point as this ambiguous harmonic modulation, a metric modulation occurs which is intended to add to the listener's sense of unease and create a sense of being 'off-kilter'. Metric modulation means that the dotted crochet becomes the new crotchet. We also move from 3/4 to 4/4.

MAIN B (solo + development)

C (F in score) There is a guitar solo over the new unstable C tonality - as with *Ides (Dream Five)* no information was given to the improvisers - this was intended to make them confront the material they were playing on that material's terms alone.

Between bars 111-123 we have another modulatory passage which introduces some whole tone movement (mirroring what happens in *Ides (Dream Five)*). This helps us to modulate to the key of Eb.

A3 (G in score)

Here the solo continues but we have a transformed version of Theme 1. It is rhythmically transformed and also harmonically transformed, as we are now in a tonal centre of Eb (the key implied by Dalt).

During this section, a sextuplet figure emerges which prepares the reverse metric modulation. The tuplet becomes the new crotchet.

D (H in score)

We have modulated up a fourth to Bb. This short section revisits the earlier tertiary movement by swinging between Bb and D7 - this allows us to modulate back to G in the next section.

MAIN A3 (recapitulation of A2, internal sections reversed)

B4 (I in score) as **B3** with variation of orchestration.

A4 (J in score) as **A2** and only time you hear non-hocketed theme one (starts bar 162).

IN - The recapitulation of electronic material, acts as bridging section into larger piece *DDK*.

4c) ***The compositional deconstruction of Ides (Dream Five) and Lady M (Dream Six) to make sketch scores of Dream One and Dream Two***

Feldman notes that:

> …each of us in his own way contributed to a concept of music in which various elements (rhythm, pitch, dynamics, etc.) were de-controlled. Because this music was not 'fixed,' it could not be notated in the old way. Each new thought, each new idea within this thought, suggested its own notation (Johnson, 2002, p. 55).

As *Ides (Dream Five)* and *Lady M (Dream Six)* were being composed it became clear that to fully realise *DDK*, a certain amount of deconstruction of these pieces might be necessary. Here deconstruction means dismantling the pieces musically so that certain key elements can be reconstituted in multiple ways during performance. Using the deconstructive methodology would allow the performers to play to, rather than play

from, these sections. It would also allow *DDK* to be more obviously conditional in nature: i.e. only fully realised and realised differently in each performance instance.

To create a conditional score, the idea of combining boxed, graphic and standard notations on a single page was explored. To that end, I started to draw rough sketches and begin to visualize how that might look. This began to allow me to conceptualise and consider how these sections might work when performed. Below is an example (literally on the back of an envelope):

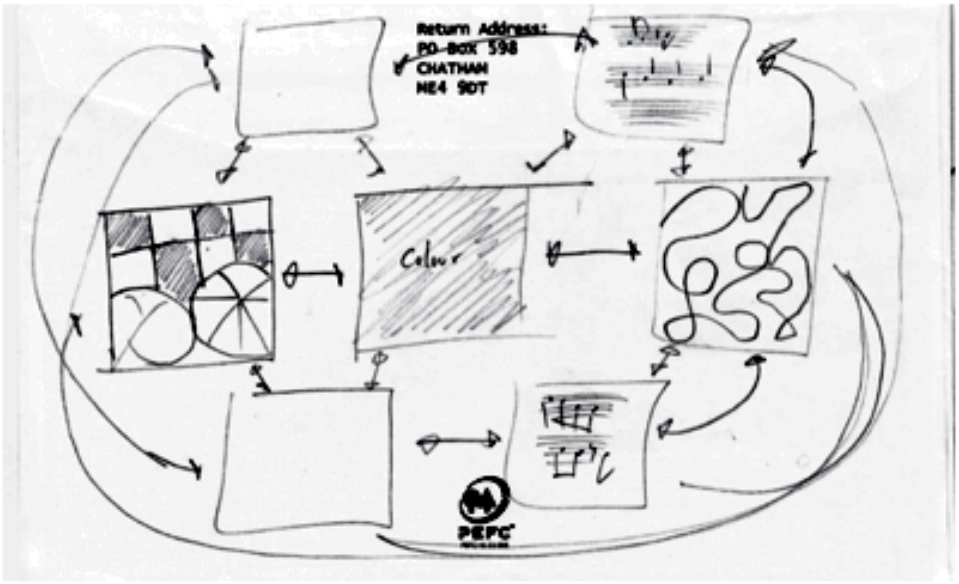


Fig.12, Vosloo, *Sketch 5*, (2015) [125]

In this early sketch; each box indicates a self-contained area and the arrows indicate possible movement between boxes. I decided to deconstruct the musical material of *Ides (Dream Five)* as *Dream One* and the musical material of *Lady M (Dream Six)* as *Dream Two.*

[125] Apologies for the quality of this image it is a pencil sketch on the back of an envelope. It has proved almost impossible to improve the reproduction of the image.

4d) ***Dream One (Sketch Score)***

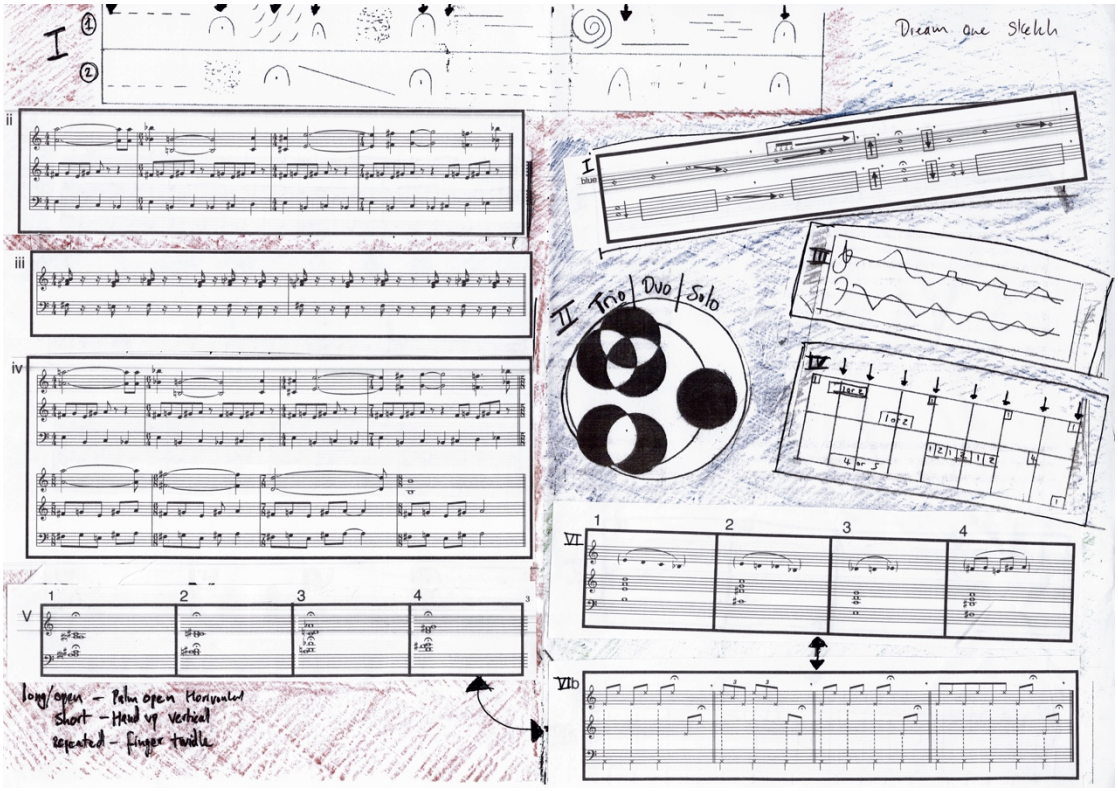


Fig.13, Vosloo, ***Dream One*** **sketch score, (2015)**[126]

Dream One is divided up into three coloured sections; red, blue and green. The colours are a personal and arbitrary short hand for describing a mood. Each of the coloured sections are numbered I, II, III and so on.

Much of the material for *Dream One* is derived from the same set of rows and related motifs used to compose *Ides (Dream Five)*. In the context of *Dreams One*, the motifs and ideas are designed as suggestions, meaning that the performer is free to play them or not. The performer is also free to transform the material as they see fit, during

[126] Apologies for the quality of this image it is a pencil sketch. It has proved almost impossible to improve the reproduction of the image.

performance. The notation of this piece is deliberately vague; as this is to encourage chance events and happenstance during performance.

To move between sections, it seemed as if there would need to be a conductor/prompter. This explains why there is a limited conduction vocabulary in the bottom left corner. This would allow some extra compositional controls when performing with certain ensembles.

Red I is a rough graphic notation where the downward arrows indicate downbeats; these would be given by a conductor/prompter. Here we see echoes of the compositional use of downbeats given by a conductor/prompter in the work of both Morris in his Conduction gestures (1995) and Zorn in *Cobra* (2002).

Red II The top stave of the system is derived from **M6** of *Ides (Dream Five)*, which is itself IR11(NP). The second stave of the system is derived from the second hexachord of IR11. This is related to **Red IV** and **Green VI**. The third stave is a broken version of IR11. To fit the irregular meter, it is necessary to vary the length of the material - essentially this is the first hexachord of IR11.

Red III is a restatement of **M7**, which is the first hexachord of P0.

Red IV is derived from the second hexachord of IR11 and is related to both **Red II** and **Green VI.**

Red V is a set of four tri-chords which, taken together, express IR11.

Blue I is another rough graphical box inspired by some of the ICP[127] Orchestra scores (Schuiling, 2014, Appendix 1)

Blue II is an attempt to represent a guided improvisation. The only control being, solo, duo or trio.

[127] Instant composers pool.

Blue III another graphical idea, quite compositionally simple.

Blue IV this is heavily influenced by Feldman, mimicking certain ideas used in his graph scores (Nyman, 1999, p. 52).[128]

Green VI The top stave is derived from IR11. The second two staves and the implied chordal movement are from *Ides (Dream Five)* **M2**. Also related to **Red II** and **IV** via the second hexachord in the top line.

Green VIb A rhythmic idea that could be applied to **Green VI** or **Red V.**

It should be noted that the sections described above were the compositional intentions. Indeed, this piece works well as a one-page piece and can be played by varied groups of instrumentalists. The process of digitisation and amalgamation into the larger piece *DDK* changed some of the compositional outputs for *Dream One*.[129]

[128] Also see *Notations* (Cage and Knowles, 1969).
[129] This is discussed in more length in chapters five and six.

4e) *Dream Two (sketch score)*

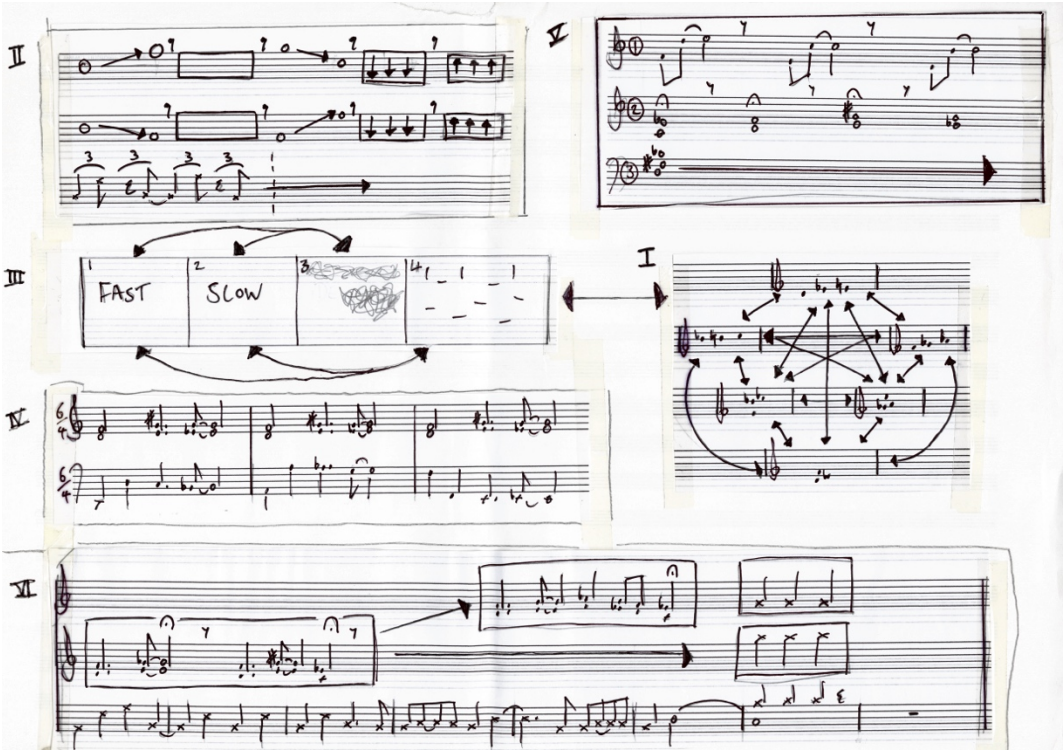


Fig.14, Vosloo, *Dream Two*, (2015)

Dream Two is a series of box notations which are all variations and reinterpretations of the melodic and harmonic information from *Lady M (Dream Six).* As a result of the *Lady M (Dream Six)* material it deconstructs, *Dream Two* is in some respects a more straightforward composition than *Dream One.* When digitised and part of *DDK*, it has potential for the production of more interesting performance outcomes.

I is a series of tri-chords that are derived from the harmonic material in **V**. There is a clear compositional link to many of the preparatory pieces as the material is arranged in a similar configuration to the *Line Pieces* and the second section of *Arches.* The reordering of the harmonic material into a series of tri-chords helps to bring *Dream Two* into line with *Dream One* in the way that sections of it are realised sonically –

this can indicate that how material is presented has a considerable impact on the way that it is realised.

II is graphical in nature and is related to **Blue I** in *Dream One*. This in turn is related to some of the notational techniques used by the ICP Orchestra (Schuiling, 2014, Appendix 1). Again, the relation to *Dream One* is important, as it provides a sonic and conceptual link between the pieces.[130] The link became very important when the pieces where digitised and integrated into the single work *DDK*.

III is a series of instructions in four boxes, it seems a little naïve when sketched like this; however, the digital realisation works well as the motion of seeing the instructions flash up in real-time adds momentum and immediacy when performing the work. There is a suggestion in the sketch that the harmonic material of **I** could be used in tandem with the instructions of **III**.

IV is the first time that we see some clearly unadulterated musical information from *Lady M (Dream Six)*. The melody, in thirds, is a partial version of the hocketed melody in *Lady M (Dream Six)*. Here it is re-harmonised and placed into a meter of 6/4. Harmonically the sequence can be described as I, bVIIaug, Tritone sub of V second inversion, I second inversion, II first inversion, Tritone sub of V first inversion, I first inversion, II, tritone sub V.

Or: D-, Caug, Eb/Bb, D-/A, E/G#, Eb/G, D-/F, E, Eb.

The E chord in all its inversions is functioning as a secondary dominant throughout this section.

V is very close to the initial sketch for *Lady M (Dream Six)* (please see submitted hardcopy sketch). The first line is a melodic gesture that gains intensity through its repetition. The second part is a series of thirds. The third line is a suggestion for a

[130] Both the sections discussed use a similar notational system.

drone - this suggests a Daug tonality which again shows a clear link to what becomes the underlying modality of the whole of *DDK*. **V** is closely related to **I**.

VI is the thirds melody, which in *Lady M (Dream Six)* is hocketed and placed into a new rhythmic context.

The whole of *Dream Two* is an experiment in taking a limited set of melodic material and applying differing sets of aleatoric notations to it - each one is designed to induce a different set of unpredictable reactions from the performers.

4f) *Dream Three and Dream Four*

At this point in the research I began to try and visualise how these differing sections might fit together. Below is a sketch that shows my thinking. This sketch, and the conceptualisation that it represents, is similar in look to many of the box notations which can be found in my preparatory pieces *Ides (Dream Five)* and *Lady M (Dream Six)*.

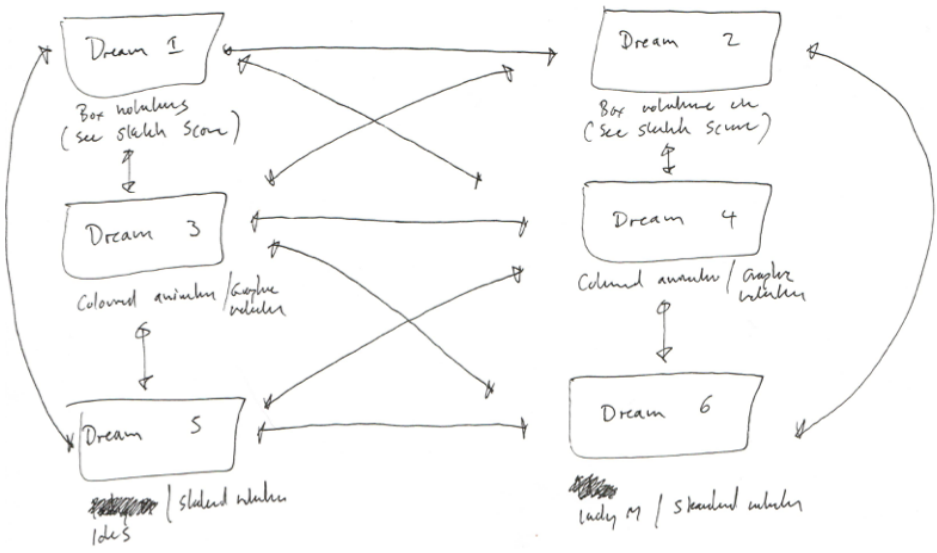


Fig.15, Vosloo, *DDK sketch,* (2015)[131]

[131] Apologies for the quality of this image it is a scan of a pencil sketch. It has proved almost impossible to improve the reproduction of the image.

There was additionally two de-controlled, aleatoric pieces which where deconstructions of the composed pieces in *Dream One* and *Dream Two*. What was lacking was a couple of more de-controlled sections; these sections would become *Dream Three* and *Dream Four*. In the above sketch (Fig. 15), I describe them as coloured animation/graphic notation.

At this point, animator Lawrence Watson was contacted to make two abstract animations, which would become *Dream Three and Dream Four*. I have collaborated with Watson before and thought that his work had many of the elements that I would be looking for such as the right level of abstraction, movement, and colour use. Knowing and respecting a collaborator makes working together easy, as one can feel confident that a limited set of instructions will enable a trusted collaborator to produce something artistically coherent with the musical ideas. Limited sets of instructions (when given to ideal collaborators) additionally allow for interesting and unforeseen creative outcomes.

The advice given to Watson was fairly abstract and limited in nature. For example, I asked him to consider the work of certain abstract expressionists, in particular Rothko and Pollock. Considering the coloured sections of the initial sketches for *Dreams One* (red, green and blue), Watson was asked to think about those colours. I also made what amounted to some 'mood board' sets of film clips and photographs.[132] The two main things I shot were two fields and the sky: deep green, bright yellow and blue

[132] Please see the folder Appendices: Images/moods/clips for Lawrence Watson, on the submitted USB stick.

respectively. As well as the colours, the movement of plants in the wind was of particular interest. It was contemplated that movement in a graphic score could have an impact on the way that musicians interpreted what they were seeing - indeed this was a call back for me to the experience of playing *Foliage.* Watson was sent links to some of the composers/artists whose work is discussed in chapter two, with particular attention drawn towards *The Snail and the Slope* (Todorovic, 2009).[133] Watson produced *Dream Three*, a blue animation, and *Dream Four*, an orange animation, as well as additional abstract animations which were used sparingly.

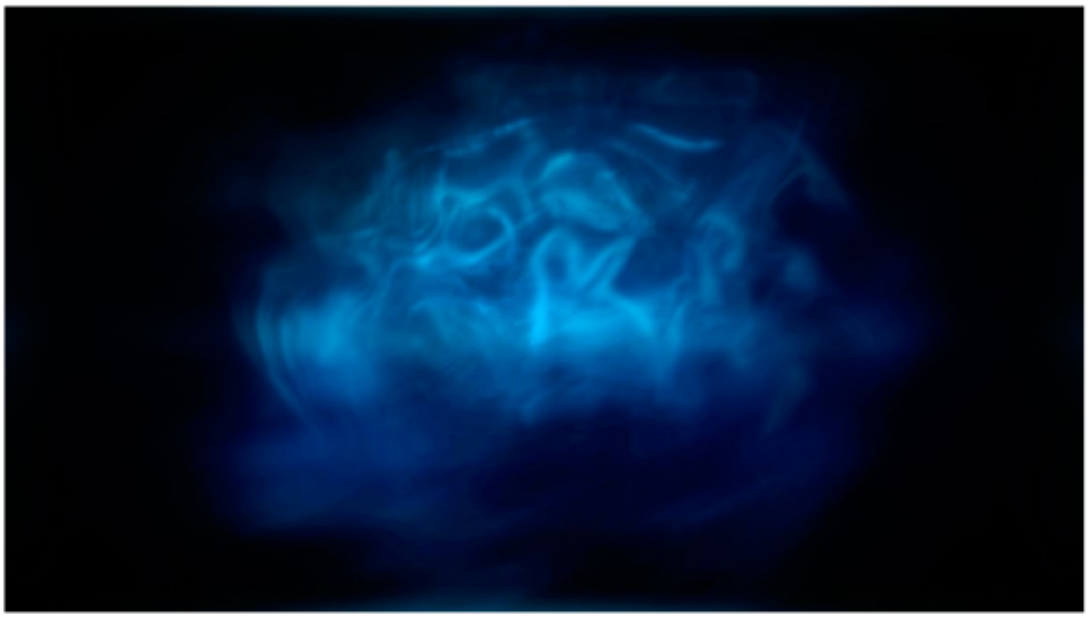


Fig.16, Vosloo/Watson, *Dream Four,* extract, (2015-2016)

[133] See chapter two for more information on Todorovic and his work.

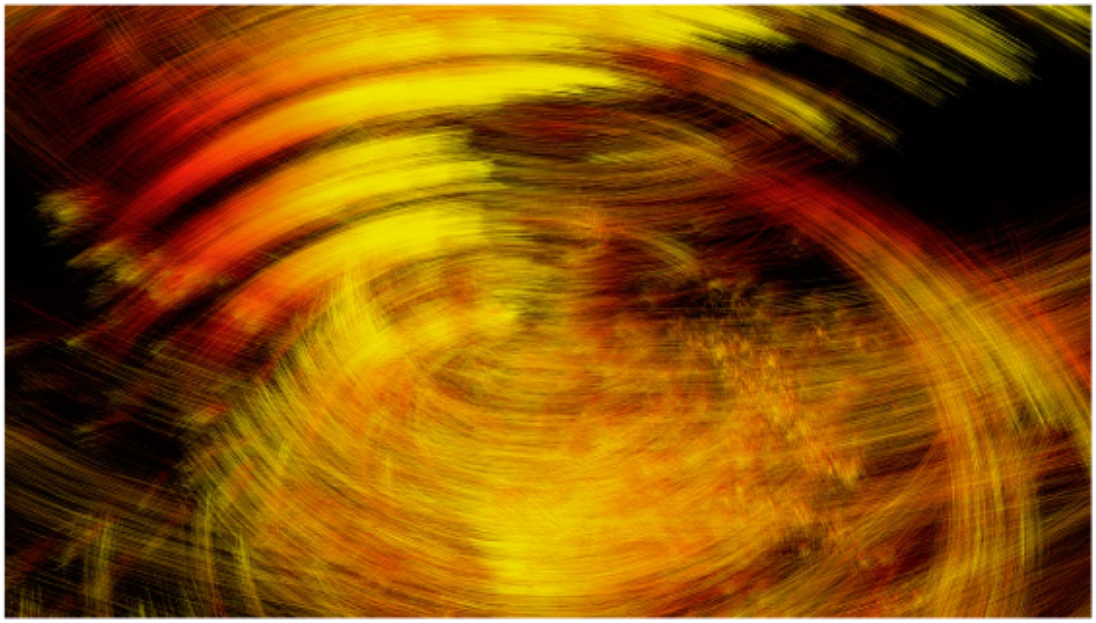


Fig.17, Vosloo/Watson, *Dream Four,* extract, (2015-2016)

Both animations can loop for an indefinite amount of time. The blue animation links to the blue section of *Dreams One* and the orange section is a development of the red section of *Dreams One*. The only change asked to be made between the first draft and the second draft of the animations was to slow the pace of the animations on-screen movement.

With completed sketch scores of *Dream One* and *Dream Two*, the related animated graphic scores of *Dream Three* and *Dream Four* and the fully notated pieces *Ides (Dream Five)* and *Lady M (Dream Six)*, it was now time to re-assemble the material into the new, conditional piece and main output of this research, *DDK*. This reconstruction was achieved using the *DreamSampler*. In the next chapter the digitisation and animation of the sketch scores of *Dream One* and *Dream Two* and the construction of the *DreamSampler* are discussed.

Chapter 5: Methodology and Project Activity Three:

DreamSampler

This chapter discusses the conceptual, practical and collaborative development of the *DreamSampler*. Also discussed is the digitisation and animation of the paper sketch scores of *Dream One* and *Dream Two*. This chapter considers and highlights the practical problems and limitations with the *Dreamsampler*.

5a) *Conception*

As the working sketch at the beginning of section 4F in the previous chapter shows, I had been considering ways that the different pieces/sections that make up *DDK* could be made into a long form conditional piece from early in the research process. What was of great importance to me was the idea that the piece could be structurally and formally mobile. I thought that that the identity of the piece thematically would be fairly secure, due to work undertaken at the micro level compositionally.

One proven way to achieve mobility of form would have been to have cue cards or a version of conduction and a conductor/prompter.[134] Bearing in mind the research questions, a technology-based[135] solution was sought, an approach that would allow a performer or performers to guide the form of the piece from inside the performance. The aim was to create a unique musical aesthetic: being part of the practical realisation of the thematic, aleatoric and pan-idiomatic improvisatory framework, this would create unique insights into how the piece should develop structurally. Most

[134] See chapter two for multiple examples of practitioners that have taken this approach.

[135] Here we are referring to projected real-time notation systems, which include the *DreamSampler*.

importantly, it would be entirely context dependent. *DDK* could become a conditionally finished piece[136] having the potential to be new each time it was performed. Also, as discussed earlier, when the piece was realised and performed it might be possible to consider the work as a total sound-object.[137]

If we consider the research questions[138] of the project, it is clear that the key practical insights of the whole project stemmed from seeking a response to the practical question: would it be possible to build a visual sampler? The conception of a visual sampler is for a piece of software which acts for the visual, in exactly the same way as an audio sampler acts for audio. Both the visual and audio sampler are key pieces of technology. Envisaged was a visual sampler that if built according to my intentions, would allow the sections and subsections of the piece (or any other piece using the framework) to be controlled and reordered visually. The visual sampler would permit the performers to become living, changing musical samples, leading to a situation in which how the performers react musically to what they are seeing, will be broadly the same, but not identical. The musicians could then be guided into divergent musical fields, without feeling that they are being limited as performers. During the

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[136] See Chapter seven.

[137] See Chapter seven.

[138] How does our understanding of, and relationship to, composition and improvisation change when new technologies are used in performance settings?

In what ways can 21st century practitioners employ technologies to create new methodologies that challenge older, more established, paradigms?

How can technologies be employed to challenge and extend traditional concepts of notation, forms and genre?

development of the visual sampler we referred to it as the *DreamSampler*, and the name stuck.

I discovered that there are a number of different programmes on the market which could nearly do what I wanted the *DreamSampler* to do, albeit not completely. Programmes such as *AfterEffects* (Adobe, 2018), *Max/Msp* (cycling74, 2018) and *Live* (Abelton, 2018) can all handle and manipulate video, but they lacked certain key abilities.

I intended that the *Dreamsampler* would be able to do the following:

I) The ability to split the screen up to four times.

At the conceptualisation stage the ability to segment the screen for each performer seemed an important requisite of the research. If achieved, it would mean that the screen could be split, and each performer could play from their own quadrant of screen. In this way, multiple parts of the score could be happening at the same time.

II) The ability to have multiple controller inputs.

Initially I intended that all the performers should have the ability to control the score (in practice this was challenging).

III) The ability to do point to point and algorithmic animation.

I had begun to think that the visually controlled and un-controlled sections should be the opposite of the musically controlled and un-controlled sections. As a juxtaposition, the intention would be to alter an audience's perception of the piece and I sought to blur any distinction between composed, improvised, aleatoric and indeterminate performance.

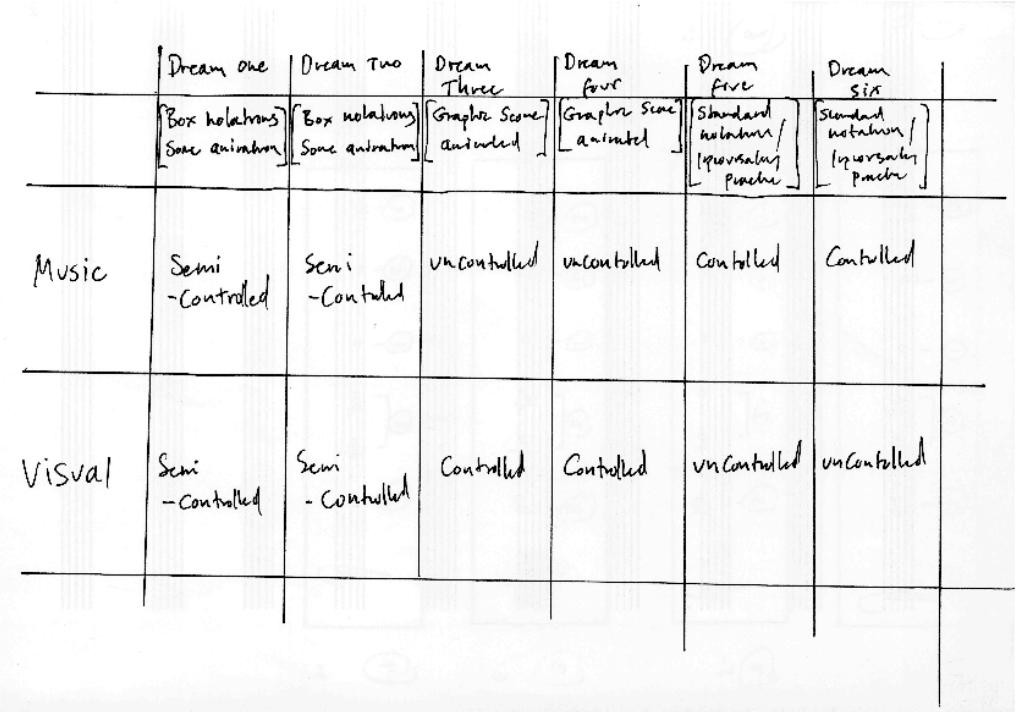

Fig.1, Vosloo, *Sketch,* (2016)[139]

V) The ability of the program to be expandable.

It was intended that *DreamSampler* would be able to be updated and have new functions added to it easily.

VI) The ability to create an app version of the program.

The ability to make an app version would make the *DreamSampler* available to other composers, performers and practitioners. It would be interesting to see how others used this tool.

Having looked into 'off the shelf' options, I thought that another collaborative partner might be of use, as it had become obvious that since none of the existing programs

[139] Apologies for the quality of this image it is a scan of a pencil sketch. It has proved almost impossible to improve the reproduction of the image.

could meet all of the stated requirements, the only solution to this problem would involve some coding. I contacted a friend and regular collaborator David Cuesta, founder of the company Creative Research and Development (CRD). CRD specialise in animated visuals, visual design, web design and app development. I have worked with Cuesta for over a decade on a number of different projects. CRD were commissioned to co-design and code the *DreamSampler.* Through discussion, it was decided the best way to build the *DreamSampler* would be to use a programming environment called *Processing* (Processing/MIT, 2018). *Processing* is a powerful program/language for building any type of visual artefact within a computer.

5b) ***A note on collaboration***

As previously touched upon in the previous chapter[140] collaboration was central to this project. Andrew Durkin's thesis in his book *Decomposition* (2014) had a profound effect on my thinking in this area:

> By constraining musical understanding within the limits of traditional notions of authorship, and a blind faith in authenticity, that exalted view distracts us from the processes that produce music—not the conscious creative processes of the individual composer (many composers are only too happy to talk about how they work) but the much less obvious contributions of a broad array of collaborative and mediating activity (Durkin, 2014, p. 5).

Visual languages, animation and programming are all complex and specialist areas; it became clear that to complete *DDK* in the way that I had conceived it compositionally and

[140] The discussion in section 4f

performatively I would need collaborators. As previously discussed, I collaborated with Lawrence Watson to realise *Dream Three* and *Dream Four* and with David Cuesta/his team at CRD to realise the *Dreamsampler.* There was always a clear delineation between my work and theirs. Collaborators were given clear briefs. I worked on the conceptual and compositional matters and they worked on technical matters related to their fields of expertise. Watson was given mood boards made up of clips and photographs,[141] CRD essentially digitised and animated elements of *Dream One* and *Dream Two* as well as coding the *DreamSampler.*[142]

The experience of collaborating with artists from non-musical worlds was rewarding and enlightening. There were a number of points wherein my collaborators made choices which led to interesting musical results, such as the way in which certain two-dimensional sketches were animated and the speed at which the animations moved.[143] The fact that this part of the research was collaborative and had an indeterminate and improvisatory nature was in keeping with the rest of the research, both underscoring the nature of, and contributing to the project. The collaboration with these partners became equal in importance to deploying the appropriate compositional techniques alongside the appropriate improvisatory and performance practices, as well as selecting the best suited personnel to perform the work. All of these separate collaborations were paramount to the success and realization of *DDK.*

[141] See Appendices: Images, clips moods for Lawrence Watson, on the submitted USB Stick.

[142] This is dealt with in some detail in section 5b.

[143] This is discussed at greater length later in this document.

5c) *The DreamSampler framework*

The principle of the *DreamSampler* is fairly simple: when a button or pad is pressed, a hand or foot controller sends a continuous midi message to a program. The program then projects a still image of some type or piece of footage/animation, which corresponds to the button that has been pressed. When the button is pressed again, the image stops being projected. The *DreamSampler* back-end consists of six buckets of ten samples. A bucket is a collection of related samples. The sample can be any visual file type, though the jpeg or mp4 are favoured formats since they use less processing power. Across the top of the screen are three modes: Map, Load, and Play. Map lets you assign images/footage to specific pads. Load lets you load a specific file which has the mapping already done. Play runs the sampler - all you see at this point is the images assigned to the pads when they are pressed. The *DreamSampler* can divide what is projected into four: it can play/project up to four clips simultaneously.

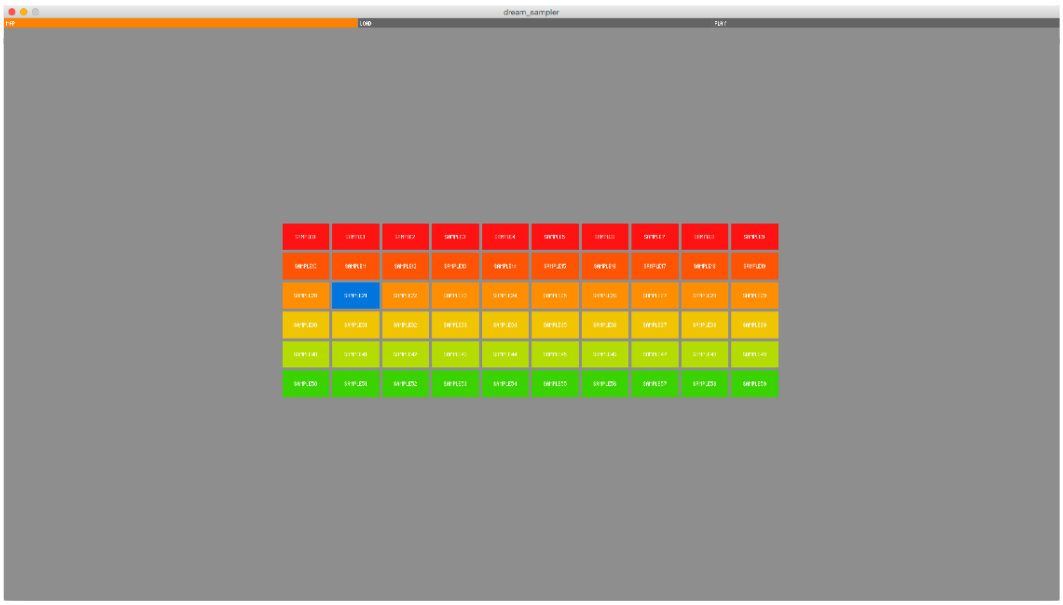

Fig.2, Vosloo/CRD, *DreamSampler* backend interface (2016)

With the technological framework in place it was then a question of deconstructing and digitising the remaining compositional elements that would make up *DDK* so that they could then be reconstructed in such a way to run/use on the *DreamSampler*. In practice this meant the deconstruction and digitisation of the pieces *Dream One* and *Dream Two*. As discussed in chapter four, the pieces/sections *Dream Three* and *Dream Four* were already predesigned as animated graphic notation and digital by their nature. This meant that to deploy them within the *DreamSampler* framework was very simple: the animations could be assigned to a pad within the *DreamSampler* and could then be projected as a loop when that pad was pressed during performance. Likewise, the pieces/sections *Ides* (*Dream Five*) and *Lady M* (*Dream Six)* would be played from standard notation with the *DreamSampler* providing point to point/algorithmic animation; the program would then turn sound into animation.[144] As Cuesta was involved in the design and coding of the *DreamSampler,* it seemed logical to get him to convert the sketches of *Dream One* and *Dream Two* to work within that framework. The nature of the manipulation of the images was slightly more involved than that of *Dream Three* and *Dream Four*, as *Dream One* and *Dream Two* needed to be more closely linked to the technological architecture of the *DreamSampler*. Unless those sections/pieces were carefully mapped to keys within the sampler then the compositional integrity of *DDK* may not have worked as well as was intended: *Dream One* and *Dream Two* were assigned a bucket each within the *DreamSampler*, with each box notation becoming a sample within that bucket.

[144]In the end this proved problematic: please see problems and limitations section.

5d) ***Turning the paper sketch scores of Dream One and Dream Two into visual samples***

I gave Cuesta and CRD all of the rough sketches that are in this chapter, in addition to the sketch scores of *Dream One* and *Dream Two*.[145] These were to be the parts of *DDK* that he would animate and alter. The only instruction on this point related to which numbers could be animated and which had to be left alone. I wrote out the musical notation from the sketches in the notation software *Sibelius*. Cuesta polarized the colours; white on black is far more effective when projecting an image. I then stipulated which box notations could be animated and which had to remain 'as is'.

The original sketch score of *Dream One* is below:

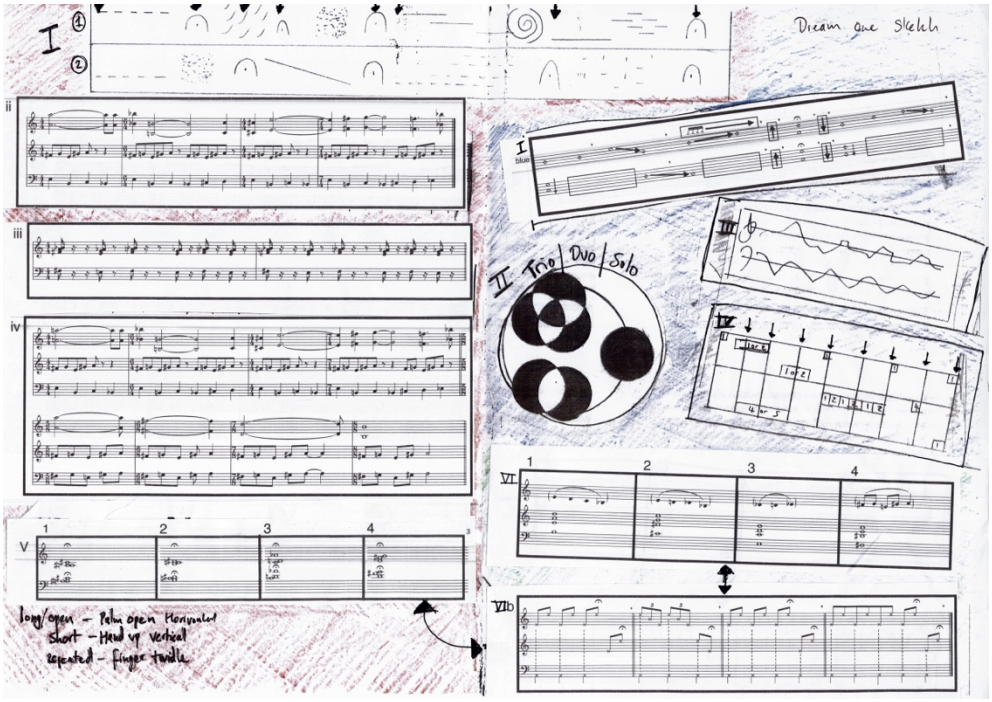

Fig. 3, Vosloo, ***Dream One*** **sketch score, (2016)[146]**

[145] Both the working sketches and the sketch scores of *Dream One* and *Dream Two* are included as hardcopies in this submission

[146] Apologies for the quality of this image it is a scan of a pencil sketch. It has proved almost impossible to improve the reproduction of the image.

When put into *Sibelius*…

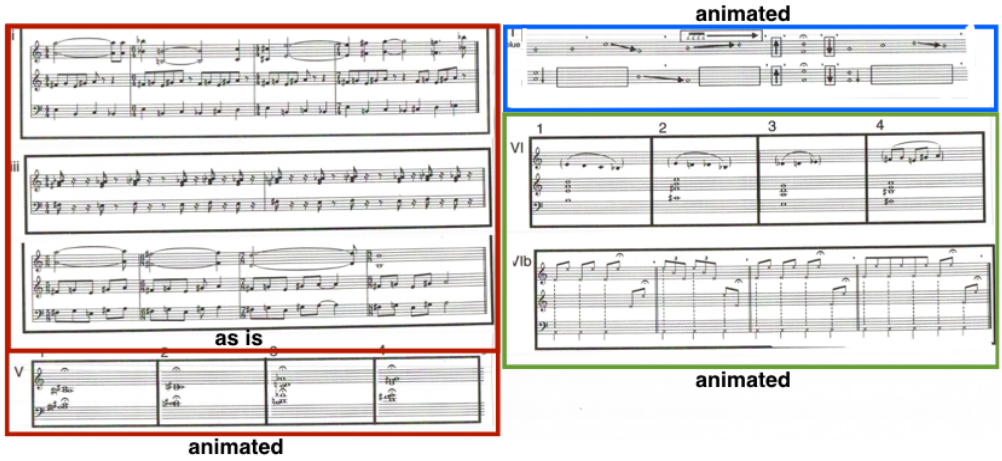

Fig.4, Vosloo, *Dream One* sketch score (version 2), (2016)[147]

turned into the animated version below:

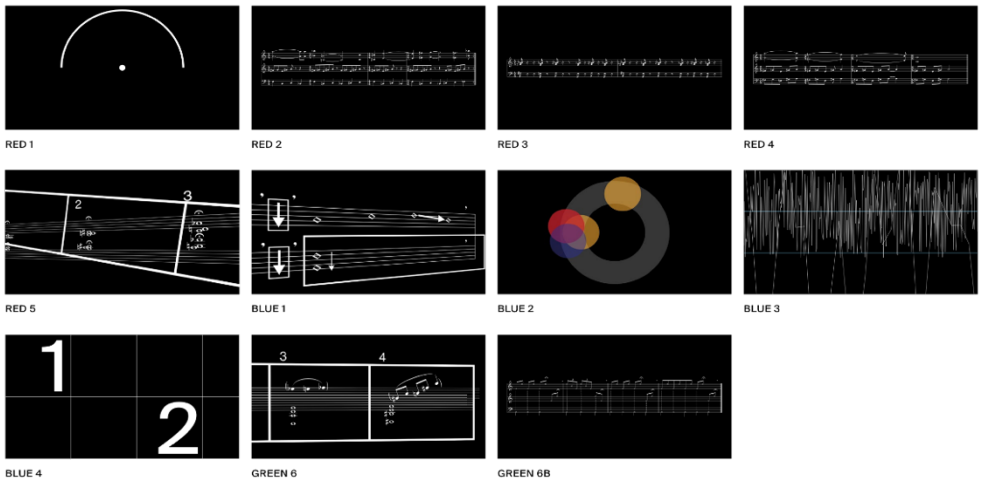

Fig.5. Vosloo/Cuesta, *Dream One* (version 3 – *DreamSampler* stills), (2016)

Of the original box notations in the sketch score, Red I and V, Blue I, II, III, IV and Green VI were animated. The rest of the box notations were left as they were. I only

[147] Apologies for the quality of this image it is a scan of a physical cut and paste mock up. Its inclusion seems necessary as a way of detailing the visual and notational development of the project.

stipulated which box notations could be animated, allowing Cuesta and his team a free hand to be creative in how they carried out the animation. This led to a number of interesting and unexpected results, in the more abstract sections especially. It was in the sections Red I, Red V, and Blue I-VI that the greatest difference between the sketch score and the animation can be observed. This seems to be connected to the added element of movement that animation allows. As a performer, the experience of engaging with moving notation of any type can change the performance approach. The original sketch score of *Dream Two* is below:

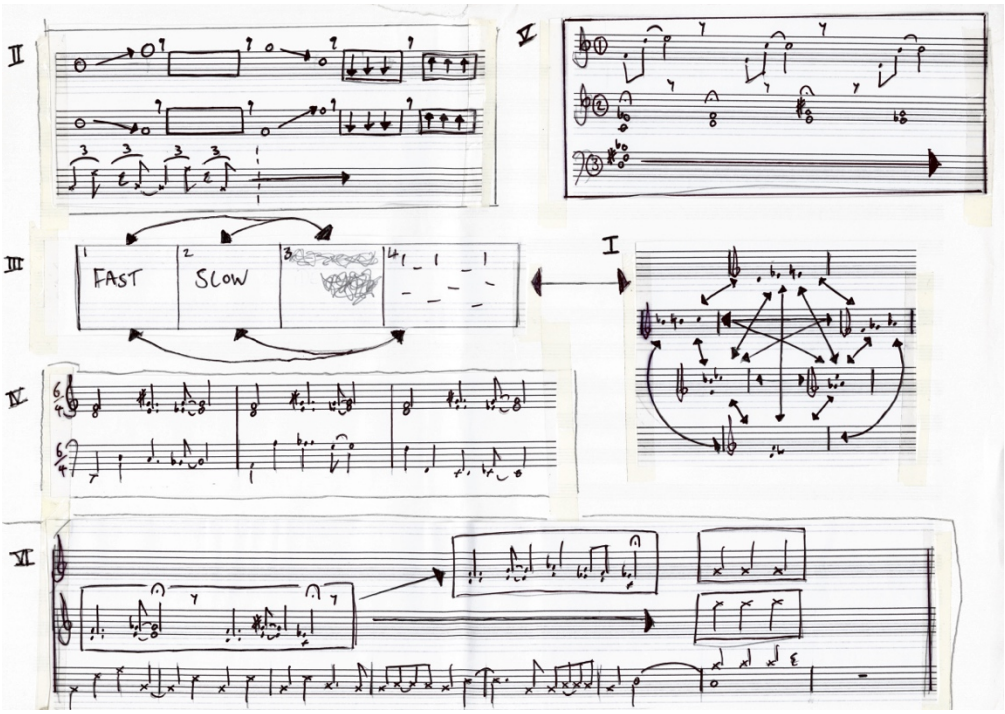

Fig.6, Vosloo, *Dream Two* sketch score, (2016)[148]

[148] Apologies for the quality of this image it is a scan of a pencil sketch. It has proved almost impossible to improve the reproduction of the image.

When notated in *Sibelius*…

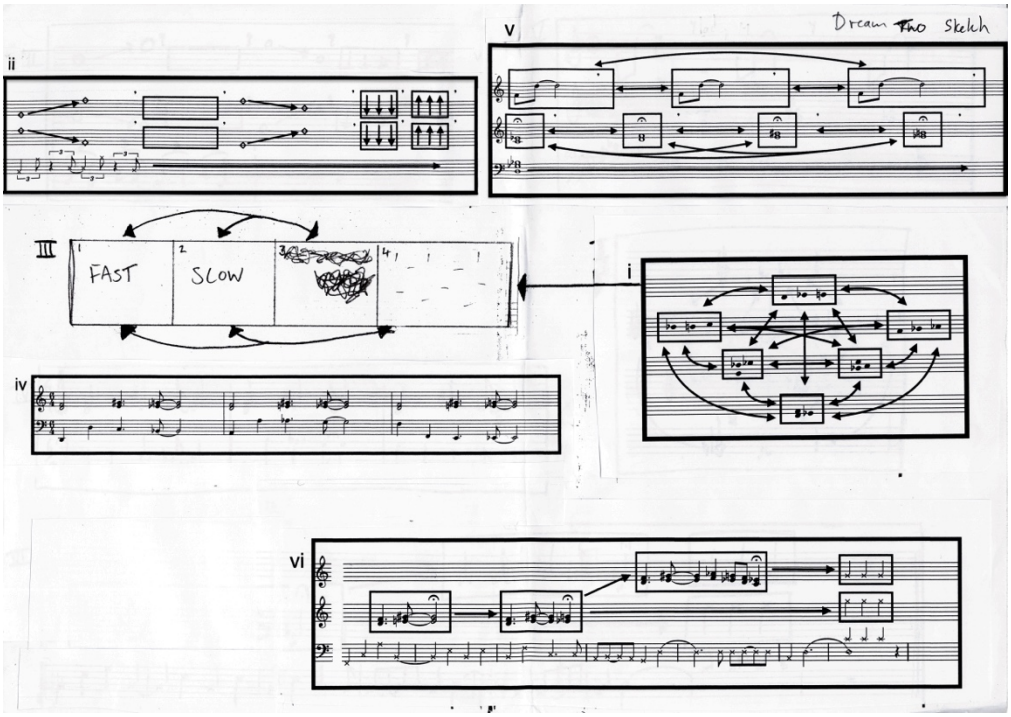

Fig.7, Vosloo, *Dream Two* sketch score (version 2), (2016)[149]

turned into an animated version of this

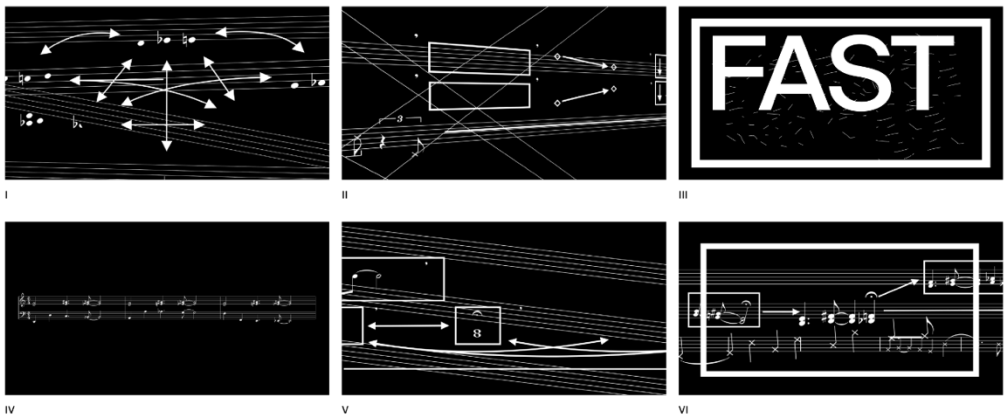

Fig.8, Vosloo/Cuesta, *Dream Two* (version 3 – *DreamSampler* stills), (2016)

[149] Apologies for the quality of this image it is a scan of a physical cut and paste mock up. Its inclusion seems necessary as a way of detailing the visual and notational development of the project.

In *Dream Two*, all of the box notations are animated apart from IV, which is 'as is'. In the case of both *Dream One* and *Dream Two* each of the black and white numbered boxes become, and are treated as, individual samples when loaded into the *DreamSampler. Dream One, Dream Two, Dream Three* and *Dream Four* within the framework of the *DreamSampler,* become buckets, that is their samples are grouped together for use. This was particularly important, as the samples needed to be grouped together for compositional integrity.

5e) *DreamSampler problems and limitations*

There were/are a number of problems and limitations with the *DreamSampler*. These came about because of time and budget restraints. In the event that the *Dreamsampler* continues as a post-doctoral project, many of these issues could be resolved. The construction and recording of *DDK* was the first test of the *DreamSampler* in a practical environment and, in many ways, it performs well. It is easiest to consider the *DreamSampler* as a beta version of the software.

Issues that will need addressing are as follows:

(I) The save function needs some work. Only being able to save sample and bucket configurations as a single xml file, which has to be saved in the *Processing* folder is not particularly helpful. However, for the realisation of *DDK* this wasn't particularly an issue. It would become an issue if one wanted to write and perform multiple pieces using the *DreamSampler* framework.

(II) There were a number of glitches, freezes and crashes caused by rogue code. The most significant of these occurring after we exported the *DreamSampler* as an application. In *Processing* once you have coded what is called a Sketch (the programme) you have two choices; you can run the program within *Processing* or you can export the programme as a standalone app. When the programme was exported as an app it started to consider the projected screen size for all sample pads to be one pixel by one pixel, meaning that when a sample was triggered nothing happened. To fix this, the programmers had to write a counter line of code to tell the programme to return the screen/sample size to normal if it found a screen sample size of 'one x one'. This is not the most elegant solution, but it does illustrate the improvisational aspects of software development. Which in of itself has a number of parallels with the concerns of this research, although it is outside of the remit of this research to discuss this any further.

(III) Another key issue was that we couldn't implement multiple controllers for the *DreamSampler*. Initially I had wanted to be able to have multiple controllers so that the form of the piece was not only mobile but also decided collectively. This is something that would be of use to implement as part of continuing research.

(IV) The principal issue was with the point-to-point and algorithmic animation. As previously stated, I had conceptualised this to accompany the sections *Ides* and *Lady M*. The computer would have animated in real-time the music that was being fed into to it (in this case the pieces/sections *Ides* and *Lady M*). However, given the restraints of time and budget, we could not

> get this to function (the two constraints being related). At the point during coding (Jan-April 2016), encoding point-to-point animation in *Processing* was a difficult and time-consuming thing to do. It is now quite possible to use a programme called *Jitter* (which is part of *Max/MSP*) to do point-to-point animation. *Jitter* was always the simplest way to do this, but it had a number of limitations. These were mainly that it could only run on a single screen within the *Max/MSP* programming environment and that it was not possible to run *Max/MSP* and *Processing* in conjunction. What has changed since beginning the project is that *Processing* can now be embedded in *Jitter* and vice-versa. If there were the opportunity to do more research and development, this would be the key aspect to implement to make the *DreamSampler* more effective.

In order to complete the project despite the limitations of the sampler, we recorded rehearsals of both *Ides* (*Dream Five*) and *Lady M* (*Dream Six*) and sent them to Watson. Because they were notated with standard notation these two pieces/sections had a fixed form and tempo, so we could be fairly certain of the amount of time they would take to play. Watson then produced fixed abstract animations to the rough rehearsal recordings of both *Ides* (*Dream Five*) and *Lady M* (*Dream Six*). These animations could then be turned into visual samples which could be triggered at the relevant point within a performance of *DDK*. Though such a concession to pre-considered forms was not ideal in terms of the overall aesthetic of the piece, it was the only major compromise and made in order to include a visual element for each section/piece within *DDK*; this meant that not only a complete audio version of the piece was possible, but a complete (if slightly compromised) audio-visual version of the piece was also possible.

At the end of this research and development phase, the project appeared to be in a positive position. The technological framework *DreamSampler* had been coded and was working as a beta version. As discussed, a few practical issues had arisen, but suitable solutions and workarounds had been found. The major piece and main output of the research had been written in six discrete, but heavily related parts: *Dream One* (box notations formed by the deconstruction of *Ides*), *Dream Two* (box notations formed by the deconstruction of *Lady M*), *Dream Three* (animated graphic score), *Dream Four* (animated graphic score), *Ides* (*Dream Five)* and *Lady M* (*Dream Six*). As discussed in this, and the previous chapter, these pieces/sections had been transformed in various ways that allowed them to function within the *DreamSampler* framework. Once assembled within the *DreamSampler* framework, these pieces became the conditional work[150] *DDK*. What was now left was to realise a version or versions of the piece in a performance environment. This is the subject of the next chapter.

[150] See chapter seven.

Chapter 6: Methodology and Project Activity Four:

Performance and Recording of *Dreams of a Delinquent King*

This chapter discusses elements and issues around the performance and realisation of *DDK*. These include ensemble choice, the recording process, subjective observations about the performative elements of the composition (from the perspective of a performer). This chapter also touches on possible differences between the audio only version of *DDK* and the audio-visual version of *DDK*.

6a) *Ensemble Choice*

For the performance, recording and realisation of *DDK*, I decided to use an ensemble of four players:

Matthew Bourne - Piano, Rhodes, Wurlitzer and analogue synths. All Bourne's instruments were routed through a space echo tape delay; this meant he could apply a reverb and delay to any or all of the keyboard instruments during performance/recording as he saw fit.

Tim Giles - Drums, FX and synths. As with the keyboards, Giles had the ability to process his acoustic drums in real-time during the performance/recording.

Rob Updegraff – Electric Guitar. The FX of Updegraff's pedal board allowed him to produce a multitude of sounds, many that were quite non-traditionally guitar-like.

I played both electric and acoustic basses. I ran the basses through the FX of my pedal board, giving me multiple sonic options. I was also using a program called *MidiBass* (JamOrigin, 2018) to do real-time audio to midi conversion in my laptop. This allowed me to play any virtual instrument that I had loaded on the laptop from my bass. I predominantly used the *Arturia 5* pack (Arturia, 2018) (mainly their emulation of the *Oberhiem* synth and also the *Farfisa* organ). A foot controller was used for

controlling the *DreamSampler*. As detailed above a raft of musical technology was used by each performer, allowing for a personal and group manipulation of sound at the performance level.

There were several reasons that I chose this group of players. First, we have all musically collaborated for a considerable time in a multitude of different contexts. This allows us a musical rapport which is difficult to achieve in any other way. I would suggest that this is in no small part down to the fact that a multitude of musical and extra musical negotiations have already taken place, and certain protocols have been agreed upon. This is not to say that these negotiations and agreements where ever consciously articulated, just that they occurred and where resolved in an evolutionary way over time. Secondly, these musicians had been part of many of the preparatory pieces, particularly the pieces catalogued in the Towards a Sound-world section of the preparatory pieces. This gave the musicians some insight into the sound-world that *DDK* would hopefully operate within. These musicians were thus integral to realising *DDK* sonically. Thirdly, this mixture of instrumentalists allowed for the broadest possible sound palette with the smallest number of personnel. They facilitated a movement from an acoustic piano trio sound to a more constructed electronic sound. Sonically this was an important facet of the piece *DDK*.

6b) *Recording process*

We recorded on the 10th and 11th May 2016 at the Fishmarket studio in London. Apart from a short rehearsal of *Ides* (*Dream Five*) and *Lady M* (*Dream Six*) prior to recording, which was (as discussed in chapter five) so that I could send recordings to Watson, we had no preparation for the recording of the piece. Practically speaking,

anything other than this brief rehearsal wouldn't have been possible, as the performance necessitated and relied upon the use of a 16'x 8' fast fold screen which *DDK* was projected onto (anything smaller would have meant a loss of detail when the screen was divided into four). The screen itself was hired in for the recording, meaning that rehearsals were limited by access to the screen.

Cuesta and a team from CRD came for the first day of recording to troubleshoot any issues with the *DreamSampler*. Pat Davey came on the second day to catalogue the process of recording. Davey had issues with digital storage, which meant that a significant portion of footage was lost. The version of *DDK* included in this submission entitled *DDK* (with in studio footage) has some of Davey's footage edited into the main laptop feed - this allows an insight into the experience of the performers.[151] It also provides a different context from viewing just the output from the laptop.

The first day was mainly taken up with setting up, due to the amount of equipment. Once set up however, the performative aspect of the recording was straightforward. As the performances either felt like they worked, or they didn't. Before attempting a full version of *DDK* (that is, a version/performance which incorporates most or all of *Dream One*, *Dream Two*, *Dream Three*, *Dream Four*, *Ides* (*Dream Five*) and *Lady M* (*Dream Six*) and is the length of an album) we recorded versions of different *Dream One*, *Dream Two*, *Dream Three* and *Dream Four.*[152] This was a process which

[151] Please see raw film footage and photos in the folder: Appendices: Photos and raw footage of *DDK* recordings, on the submitted USB stick for greater detail of the performance/recording environment.

[152] *Dream One* (Take 2), *Dream Two* (Take 2), *Dream Two* (Take 3) and *Dream Three* are included in the submission and can be found on the submitted USB stick in the folder: Other Dreams: audio.

effectively allowed the musicians to become familiar with the *DreamSampler* system, and to understand in their own ways what the performance practice demands of the piece were. This part of the recording process also allowed me to gain an understanding of the *DreamSampler* system in a practical performance situation. In effect I was also learning what the performance practice demands of the piece where. That we were learning about the specific performative aspects of this piece as we recoded seems apt for a piece which is deliberately designed to be conditional. Initial takes were either technically or aesthetically unusable,[153] as the musicians had not yet worked out the correct personal performance practices for the piece and how those related to the aesthetic boundaries and limitations of the composition. This led to either takes breaking down or the compositional material getting lost within the performance. Over the two recording days culminating in the recording of the full version of *DDK*, an accommodation was reached between the performers' discreet improvisatory practices and the demands of this piece. A balance was also struck between the electronic and the acoustic, in terms of how much linear time we spent within each aesthetic space (acoustic or electronic, or somewhere in-between the two), arguably (where appropriate) the improvisation that articulated these spaces was pan-idiomatic in nature. Making these musical accommodations are what allows the performance to function as a complete piece.

We recorded one full version of *DDK,* which is just over fifty-two minutes long. As footnoted earlier I have included in this submission several versions of *Dream One*, *Dream Two* and *Dream Three*, it is intended that these fragments help illustrate the similarities and differences between versions of the same pieces/sections. Hopefully

[153] This is why they are not included with the submission.

by listening to these fragments it is possible to hear the overall identity of the composition, as well as the musicians reaching a gradual accommodation with the music. For example, a direct three-way comparison between *Dream Two (Take 2)*, *Dream Three (Take 3)* and the section of *DDK* that is *Dream Two*, shows a remarkable flexibility is possible in approach but that a compositional identity is maintained. It is also hoped that this underlines the notational, schematic and compositional validity of the approach taken.

It is worth noting[154] that there are three versions of *DDK* included in this submission (included on the submitted USB stick). In the folder Dreams of a Delinquent King there are the following subfolders: audio, which contains an audio recording of the piece *Dreams of a Delinquent King* and video, which contains two audio-visual versions of the piece: *DDK master (score)* and *DDK (with in studio footage)*. The audio-visual *DDK master (score)* is literally the score of the piece: this is the video output from the real-time score that the musicians where performing from. *DDK (with in studio footage)* is the same audio-visual video output with in-studio footage edited in, as it is intended that this will provide context to the performance practice deployed in the realisation of the piece. It is also worth noting that in the Other Dreams folder there is a similar layout as that discussed above: In Other Dreams Audio are audio recordings of *Dream One (Take 2)*, *Dream Two (Take 2)*, *Dream Two (Take 3)* and *Dream Three*. In Other Dreams video are audio-visual recordings of *Dream One (Take 2)*, *Dream Two (Take 2)*, *Dream Two (Take 3)* and *Dream Three*. As with *DDK* the video of these pieces is also the score: these videos are the output from the real-time score that the musicians where performing from.

[154] This was initially laid out and discussed in chapter one

6c) *Subjective Observations*

I) *Form*

The complete (submitted) version of *DDK* ended up having a symmetrical form:

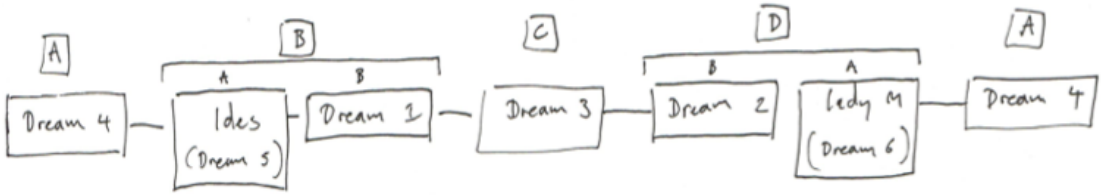

Fig.1, *DDK* form sketch, Vosloo (2017)[155]

This is interesting as it was unintentional. Furthermore, if we look at the gestural layering of the piece, in terms of the controlled, semi-controlled and fully controlled aspects, we can see that it approximates an arch form. What seems astounding is that this is a call back to both some of the study pieces (specifically *Arches*) and also to *Ides*. It seems that the micro musical field has influenced the macro in unexpected ways.

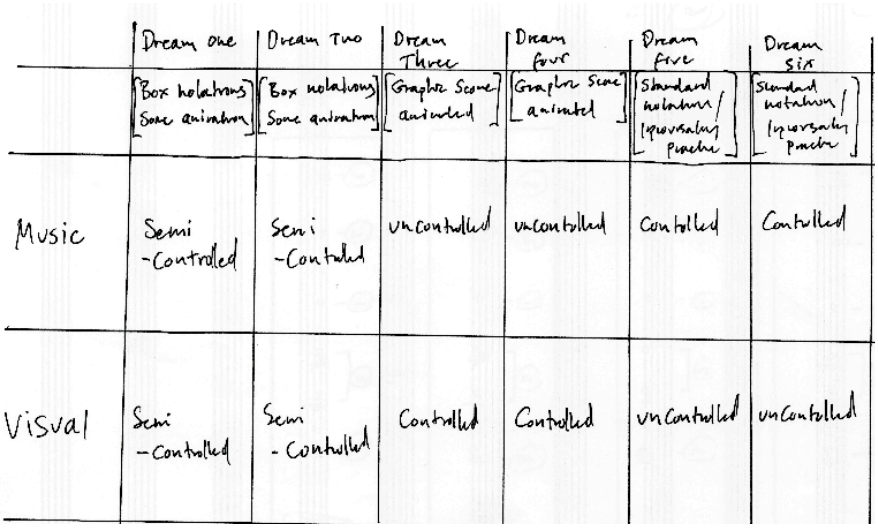

Fig.2, Sketch of controlled and uncontrolled elements in *DDK*, Vosloo (2017)[156]

[155] Apologies for the quality of this image it is a scan of a pencil sketch. It has proved almost impossible to improve the reproduction of the image.

[156] Apologies for the quality of this image it is a scan of a pencil sketch. It has proved almost impossible to improve the reproduction of the image.

It is wise to not read too much into this emergent form. As another recording/ performance of the piece would likely have had an entirely different form, as is the intention of a conditionally finished work. It is regrettable that we did not manage another complete run through, as this would have been useful for comparison purposes. Recording an extra version of *DDK* might have been possible if we had had an extra day in the studio, there may be other possibilities for performances in the future.

II) *Movement*

In the animated graphic score sections of *DDK* (*Dream Three, Dream Four*) there seems to be a perceptible link between the movement of the score/animation, and the rate of the movement and what is being played. Within this (submitted) main version of *DDK* there are two versions of *Dream Four*: the first version, which occurs at the beginning of the piece, is concerned with a quiet exploration of texture and nuanced; the second version, which occurs at the very end of the piece, is still concerned with texture but in a quite different way, as it is far louder and brasher than the version at the beginning. It is perhaps the concern for texture that leads to a sense of shared parentage between them. The notion of shared compositional parentage is also in evidence when comparing the version of *Dream Three* from *DDK* (this appears around half way through the submitted version) and the stand-alone version of *Dream Three* that is in this submission. It is interesting, within the larger context of *DDK*, to compare the animated graphic score sections of *Dream Three* and *Dream Four* with the notated and fully composed sections *Ides* (*Dream Five*) and *Lady M* (*Dream Six*). The composed sections *Ides* (*Dream Five*) and *Lady M* (*Dream Six*) which have

controlled animations[157] can be seen as musically static in comparison to the less musically controlled sections of *Dream Three* and *Dream Four*.

III) *Perceived differences in musical outputs achieved from animated and static scores*
Following on from the last observation, the relative success of the controlled and uncontrolled sections within the sections *Dream One* and *Dream Two* may also be examined. I would suggest that the most successful box notations in *Dream One* and *Dream Two* are the animated sections. The static sections of notation often produced static music. This was for a number of possible reasons:

(I) I gave no instructions to the musicians, if I had suggested that we move towards and away from the written music in the static notation, then the performance may have produced different results. Movement away and towards notated music is heavily suggested in the animated box notations, because of the way that the animations move.

(II) The way the box notations are animated is musically transformative: they are animated in such a way that they start from a static position and move through and away from that state before returning to that state; this dramatically increases the ways in which they may be interpreted. Due to the transformative nature of the animation, the section which is *Dream Two* is arguably more successful than the section that is *Dream One* – In digital/animated form *Dream Two* has far more animated sections in it than *Dream One*. This is because of a compositional decision taken during the digitisation and

[157] See problems and limitations in chapter five for an explanation of why this happened.

animation process. Having performed and recorded the piece *DDK* it seems that perhaps all of the box notations should be animated in some way. Although this is a moot point until further research has been carried out, as currently conclusions are being drawn on a limited set of outputs. Further research would involve more recordings and performances of *DDK*, as well as composing more using the *DreamSampler* framework. This research would allow further and greater analysis of successful and unsuccessful practice in this specific context.

IV) *Approaches taken and possible changes to approach*

Following on from the previous point, there are other changes and modifications which might be explored relating to the performance practice surrounding this project. It should be observed that the recording process didn't fully capitalise on the *DreamSamplers* ability to split the screen into four. This is an aspect of the performance which can be linked to the lack of instruction given to the musicians, which in itself was a function of having to work to a tight time frame. There are many ways in which the *DreamSampler* could be used with more specific instruction. For instance, when splitting the screen, performers are assigned a quadrant to perform from; additionally, when the image on screen changes the musicians must jump-cut to the new section. As we have seen more research is needed to draw further conclusions around performance practice and compositional realisation in this context.

V) *Perceived differences between audio and audio-visual versions of DDK*

When viewing *DDK* from the subjective view point of the composer/performer, the perceptual experience is markedly different than the experience of just listening to the work. In some respects, this is irrelevant, as this is a piece of music and is designed

primarily as a sonic experience. Although it must be considered that the visual medium through which the piece can be realised (the *Dreamsampler*) is integral. Arguably, if the method of realisation were different then the output (*DDK*) would have had some kind of corresponding difference. In some ways the audio-visual version and the audio versions of *DDK* are siblings, each different with certain unique qualities, and complete in themselves, but when examined together the familial similarities might become more obvious. Furthermore, experience and understanding of one version might inform and change the experience of the other version: a parallel here is listening to a piece live and listening to a recording of the same piece.
Having finished the recording there were now complete versions of both audio and audio-visual versions of *DDK*, as well as some alternative versions of some sections of the piece. The next practical stage of the recording was to mix and then master all the tracks and edit the audio into the video feeds.[158] Once this process was complete the conditional work was fixed and had could be considered a total sound-object. The next chapter examines the conceptual underpinning of these concepts. The next chapter also outlines other conclusions and considers if this project helps to answer stated the research questions.

[158] A further example of the way that specific technologies are integral to this project.

Chapter 7: Conclusions

This chapter attempts to draw conclusions about both the research and the practical work undertaken. In doing so, it examines the concepts of the conditional piece and the total sound-object and considers if these concepts might help to provide answers to the research questions. There are a number of conclusions that can be drawn from this research despite some practical compromises (discussed in chapter six). As discussed at the end of the last chapter, this research produced two major outputs in the linked and yet distinct versions of the piece *DDK*: the audio version, and the audio-visual version. Both variants are coherent and yet experience and understanding of each distinct piece informs an understanding and experience of the other. The two versions of *DDK* not only act as coherent works in their own right, but they intend to act as a proof of principle for the *DreamSampler. DDK* shows that the technology of the *DreamSampler* works, albeit in a beta version. Although it would have been possible to realise the compositions as they stood as sketches in some way. By removing the technological framework of the piece, the resulting realisation would potentially and necessarily have been quite different.

This thesis sought the answer to three questions:

1) How does our understanding of, and relationship to, composition and improvisation change when new technologies are used in performance settings?

2) In what ways can 21st century practitioners employ technologies to create new methodologies that challenge older, more established, paradigms?

3) How can technologies be employed to challenge and extend traditional concepts of notation, forms and genre?

To answer the research questions clearly, we must consider fully the concept of the total sound-object. This thesis is an exploration of this concept and the research outputs of *DDK* and the *DreamSampler* act as one possible way of realising the concept. The total sound-object provides a conceptual framework within which it is possible to answer the research questions.

7a) *Total sound-objects*[159]

As discussed throughout this thesis a total sound-object is an extension of the conditionally finished work. A conditionally finished work is a work that can only be completely realised through performance. In some respects, this is true of multitude of different music. What is unique about conditionally finished pieces is that they have a certain 'potentiality' built into them at a compositional level. There are designed elements within the pieces which can only completed by the performers, during performance. A related example is to consider indeterminate, aleatoric and improvised works in which the composer deliberately shares compositional responsibility, through collaboration with the performers playing the piece. In this research the balance and 'potentiality' is mediated through the *DreamSampler*. It is the technology of the *DreamSampler* that allows a balance to be struck between performative pan-idiomatic improvisatory freedom and

[159] Total sound-object and conditional finished works are both my terms. The total sound-object has clear links to Schaeffer's conception of the sound-object and the acousmatic experience. Indeed, the notion of 'reduced listening' when considering technologically manipulated sounds is a central notion. Please see Schaeffer (1952 and 1966) and Kane (2014) for a more in-depth analysis of Schaeffer's theories.

formal compositional rigour.[160] The total sound-object fuses the conditionally finished work with multiple technologies[161] at the point of composition in which the composer considers and compositionally manipulates the sound-world prior to creation. The total sound-object presupposes and necessitates (on the part of the composer) a deep understanding of the technological[162] processes (such as the *DreamSampler*), which are to be deployed.

If we accept that composition and improvisation become inseparable when they are recorded, then the resulting medium becomes a third object.[163] As Durkin (2014) argues, the medium is often more than the recording and the composition. Ambient sound and space can become part of a recording and should not be seen as a technical problem that has not been solved, but an artistic sound in its own right, even if it was not intended as such.[164] Our eagerness to hear around or through that sound means we are overlooking the contextual collaboration for which it is the marker (Durkin, 2014, p. 104).

The total sound-object, as well as being an extension and continuation of the conditionally finished piece, is also an extension of the recording process; it encompasses everything connected to the musical object, including all the people and

[160] It is not hard to envisage other ways in which this mediation might be achieved. If we look at the literature, there are existing systems that seek to achieve this very thing. Crucially, very few of the larger scale pieces that exist within a mediated compositional framework use technology to achieve their goals.

[161] In this instance the *DreamSampler*, the fx and synths used by performers to manipulate sound at the level of performance, the technologies used to record the music and the technologies used to video and archive the who process.

[162] In this instance the *DreamSampler*, the fx and synths used by performers to manipulate sound at the level of performance, the technologies used to record the music and the technologies which can be used to shape sound in post-production (perhaps these should be considered compositional).

[163] A third object that only recording technology of some sort allow to come into existence.

[164] One need only think of audience noise on a recording. These sounds have a contextual relationship with the music on the recording, perhaps so much so that they become part of the experience of that music.

methods of production. The conditionally finished work plus performance/recording context, plus collaborative relationships, equals the total sound-object. In this conception, the collaborative relationships between musician and the recording process are not limited to performers but extend to everyone involved in the production of the object. Moreover, the relationships also include collaboration with the environment, technologies and potentially audiences.[165]

A total sound-object can be considered a documented, complex system.[166] However, at the point at which it is documented, it stops being a complex system, since the documented version of the piece is a single frozen iteration. The next time the piece is performed it will become complex again, as noted this conditionality is written into the work compositionally. The sound-world of the total sound-object is as important as the musical content, since the sound-world is partially created through the documentation process. Knowing that the composition will be recorded and that the space and manipulation of sound will become part of the piece, the sound that is documented must be considered at the level of composition.

The composer of the total sound-object must attempt to consider all elements of the finished/captured work at the point of composition. The composer's job in the context of the total sound-object is to attempt to control the language and emergent ontology of the complex/conditional system. The *DreamSampler* is one possible solution/approach to doing this. The composer of total sound-objects must attempt to maintain a balance between multiple elements including composition, improvisation (pan-idiomatic or

[165] This idea has clear links to actor network theory Strachan in *Sonic Technologies: Popular Music, Digital Culture and the Creative Process* (2017, pp.14-17) has some informative insights into how this theory can be applied to technologically dense music contexts.

166 See: *Complexity: The Emerging Science at the Edge of Order and Chaos* (Waldrop, 1992) and *Sync or Swarm: Improvising Music in a Complex Age* (Borgo, 2007).

otherwise), performative elements, performance collaboration and any technology[167] used during the performance and/or the production/capture of the conditional work. The dynamic and complex relationship between these elements can produce unknown factors which can potentially affect and influence the total sound-object. The relationships between the above elements within the *DreamSampler* framework will be unique (conditional) for each performance. Each composition using the software will have its own language and emergent ontology: each performance and captured (recorded) version of that piece will have its own distinct but related language and ontology. If we consider *DDK,* we can see that the identity, language and emergent ontology of the main (complete) version is similar to, but distinct from, the submitted incomplete fragments.[168] Allowing a little supposition for a moment, it might follow that another composition using the *DreamSampler* framework would have a different but no less specific set of related languages and emergent ontologies. However, this supposition is not possible to validate, as only a single complete version of *DDK* has been written and realised using the *DreamSampler*, disallowing comparison of different versions of the full piece. Further versions of *DDK* and other compositions using the *DreamSampler* might be explored as part of continuing research.

Total sound-objects can be seen as hyper-real[169] blurring any notion of what is real (natural) or unreal (produced) in a recording. Deciphering the deference between the

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[167] Either the manipulation of sound at the level of performance or the manipulation of sound in post-production.

[168] *Dream One (Take Two)*, *Dream Two (Take Two)*, *Dream Two (Take Three)* and *Dream Three*.

[169] Here the hyper-real is an inability to distinguish reality from a simulation of reality. Hyperreality is seen as a condition in which what is real and what is simulated are seamlessly blended together so that there is no clear distinction between where one ends and the other begins. Individuals may find themselves, for different reasons, more in tune or involved with the hyperreal world and less with the physical real world (Baudrillard, 1991).

two for the listener may become difficult and perhaps unnecessary. Schaeffer's notion of reduced listening which he considers 'attending to the sound apart from the source' (Schaeffer in Kane, 2014, p. 28) is useful here, as something close to this is intended to be what the total sound-object asks of us when we engage with it. This also recalls critic Ben Ratliff's idea that in the age of the cloud we need to 'change how we build a conscious framework or rationale to listen to all kinds of music' (Ratliff, p7, 2016). Ratliff is considering how technology has changed the listening habits of a considerable number of people, but that there has not been a corresponding shift in the critical way that we build and develop listening frameworks. Total sound-objects are one possible solution and could constitute part of new listening frameworks built in conjunction with the compositional, performative and improvisatory opportunities and outputs that are suggested by new technology.[170] The *DreamSampler*, *DDK* and the concept of the total sound-object are perhaps examples of these new outputs afforded by technological development.

The total sound-object encourages a new and hybrid musical language that is both conditional and formal, and we may need to consider new methods of musical analysis and discussion to understand it.[171] Most orthodox musical analysis, regardless of genre, tends to be essentialist[172] in outlook. Total sound-objects point to the possibility of an alternative interpretative framework for many of the dichotomies in musical thinking,

[170] Affordable and easily available technologies for: real-time score manipulation, sonic manipulation at the level of performance, sonic manipulation of recordings in post-production.

[171] Just as Schaeffer felt the need to formalise Musique concrete into a new and discrete system. Please see Schaeffer (1952 and 1966) and Kane (2014) for a far more in-depth analysis of Schaeffer's theories.

[172] Essentialism is most commonly understood as a belief in the real, true essence of things, the invariable and fixed properties which define the 'whatness' of a given entity (Fuss, 2013).

although it might turn out to be just as essentialist. For example, within the context of the total sound-object, based as it is in the conditional performance/piece, it becomes difficult to consider, or even discuss, something as purely improvised or purely composed, as the captured sound renders these categories incomplete. Likewise, notions of real and unreal, composed and performed may need to be reconsidered. As Baudrillard (1981), Ratliff (2017) and Schaeffer (1952 and 1966) suggest, the language that we have to describe the new musical reality that the discussed technologies present needs reconsideration. Many practitioners[173] work in areas which connect the traditions of improvising and composition, but in discussion these two areas still seem to be defined by sets of related oppositional dichotomies,[174] total sound-objects might be one possible way to make these dichotomies dissipate. If it is impossible to tell how something was produced sonically then any analysis of that object may need be reconsidered in new terms. The total sound-object produced by this research (*DDK*) points toward the obsolescence of genre, as currently constituted, that Ratliff (2017) proposes. *DDK* is many existing genres and none of them at the same time. *DDK* and some of the preparatory pieces (those in the Towards a Sound-world folder) are certainly pan-idiomatic as they attempt to encompass, integrate and blur multiple compositional, performance and improvisatory orthodoxies. By being post-genre in the way that Ratliff (2017) suggests, and pan-idiomatic, *DDK* (and potentially other total sound-objects produced in other ways) challenge existing musical orthodoxies. Total sound-objects have the potential to blur many existing oppositional boundaries asking multiple questions: where does composition end and improvisation begin and vice-

[173] See chapter two for examples.

[174] That is they are understood and discussed (to a certain extent) in terms of their relationship to each other. For example, Classical and Jazz, Analogue and Digital, Live and Recorded.

versa; can we tell and does that matter? If we don't know how sounds are produced, how do we interpret them? Does that matter? Do we need new ways of listening and interpreting hybridised musical systems that are made possible by the technologies that have been discussed in this commentary? The digital age suggests a multi-layered fluid complexity; perhaps certain musicians and music are beginning to reflect that. The notion of the total sound-object is an attempt to encapsulate some of the above ideas. It is hoped that this research helps others to start to consider and work in and around the above ideas.

7b) *Questions answered*

Considering the above definition and conception of the total sound-object, the possibility of answering the research questions that this project set out to answer is increased (and the notion of the total sound-object is central to answering these questions).

1) How does our understanding of, and relationship to, composition and improvisation change when new technologies are used in performance settings?

The total sound-object in general and the specific example in the form of *DDK* attempts to challenge and change our understanding of and relationship to both composition and improvisation. The notion of the conditionally finished piece which is the precursor to the total sound-object, has at its centre the notion that the performative aspect of composition is collaborative in a multifaceted way. The total sound-object extends this concept to include situation and specific technologies.[175] Because the total sound-object asks the performers to engage with a specific set of

[175] As discussed throughout this commentary.

linked languages and emergent ontologies that have the potential to change with each performance, the performers are encouraged to engage with the conditional pieces (which when captured/recorded can become total sound-objects) anew each time the piece is performed. All performances are to some extent singular, regardless of how they are constructed. However, as discussed above, what is distinct about both conditionally finished pieces and the total sound-object is that they have difference built into them at a compositional level. This difference is then hopefully expressed in differing ways during performance. Conditional compositions and total sound-objects create conditions where performers can express themselves and collaborate fully without there being a sense that performers can rely upon a pre-existing set of performative and improvisatory approaches.

2) In what ways can 21st century practitioners employ technologies to create new methodologies that challenge older, more established, paradigms?

As with the previous question, the answer to question two is embedded in the notion of the total sound-object. The very nature of, and potential within, the collaborative hyper-reality of total sound-objects allows them to challenge older more established paradigms. As discussed above, not knowing when, where or how something was produced suggests that new methods of analysis and understanding might be needed interpret and understand total sound-objects. The pan-idiomatic possibilities that emerge from conditional composition and the total sound-object, suggest a new compositional paradigm and a connection to a new listening/perceiving paradigm as suggested by Ratliff (2017). As well as a consideration of the existing literature and specific sets of compositional and performance practices. The suggested conclusions

above, were reached after reflecting[176] upon both the audio and audio-visual outputs of the research and the experience of undertaking the practical elements of the project. The practical elements included (but where not limited to) composing in a multitude of related ways, designing the framework (*DreamSampler*), considering improvisatory schema and their relation to notation, critically evaluating and in some cases rejecting related approaches to the above points and performing the work *DDK*.

The practical methodology at the heart of *DDK,* which is based around using the *DreamSampler* is one attempt to find a solution, accommodation and integration between what would have traditionally been considered disparate musical elements. *DDK* contains (but is not limited to) elements of: 12-tone composition, graphic notation, popular music, improvisation, jazz, electronic music, and standard and non-standard notation. Furthermore, because the *DreamSampler* is resolutely an approach to real-time notation it suggests new and hybridised approaches to performance: the animated, mobile, real-time score asks the performer to engage in a way that is distinct unto itself; it is pan-idiomatic.

3) How can technologies be employed to challenge and extend traditional concepts of notation, forms and genre?

In this research, the *DreamSampler* is a specific technology which allows for the manipulation of multiple types of notation in real-time. The form of the piece is mobile, which allows for a very high number of different formal realisations before

[176] Making the interpretivist nature of this research explicit, as we are dealing with conclusions based upon a subjective position.

repetition of the form will occur. The framework of the *DreamSampler* attempts to allow several things to happen. It allows the realisation of the piece *DDK*. It also attempts to challenge the conventional hierarchical connection between the composer, conductor and performer; the *DreamSampler* attempts to allow a level collaborative playing field between these roles. However, as currently constructed (with only one-foot controller) a technical hierarchy has replaced the pre-existing hierarchies. This can be remedied with further research that would allow each performer to have a foot controller, and therefore an equal role in the performance and shaping of the piece. The *DreamSampler* also attempts to 'encode' certain 'potentialities' into a compositional system, which can then lead towards a conditionally finished piece and latterly a total sound-object. *DDK* is an attempt to show an output from this system. Furthermore, as the notational element of *DDK* is deliberately vague, it encourages articulation by the performers that may or may not be pan-idiomatic. As discussed, the submitted version of this piece incorporates genres and idioms which traditionally would not sit alongside one another. However, it is possible to imagine a version that stuck within one idiom, genre and sound-world. At this point this is supposition, but it would be interesting, as part of further research to see what the practical outcome of a string quartet, rock band or big band performance/version of the piece produced.

7c) *Continuing research*

There are a number of improvements that could be made to the *DreamSampler*. This would include a better 'save' function and a 'fade-in' and 'fade-out' function, as well as the implementation of an algorithmic animation 'bucket' within the *DreamSampler* framework. The addition of multiple foot controllers which could control the score would also be a worthwhile addition as this would make the *DreamSampler* more

egalitarian, since all the performers would be able to make decisions about the form of the piece in real-time. The ability to send the output from the *DreamSampler* to multiple networked computers or tablets would also be a useful addition. It might also be worthwhile developing a specific suite of animation programs which easily allows a composer to animate their own scores to a highly polished level.

In performance, an improved visual interface for the audience could be developed, following on from the implementation of the algorithmic animation element of the *DreamSampler*. This may end up being a parallel set of visuals for the audience, or perhaps a new notation would emerge.

The *DreamSampler* has some clear educational applications. Because *Processing* isn't particularly CPU hungry it is possible to run the *DreamSampler* on a Raspberry PI computer, it is not difficult to envisage an educational program which asks children and teenagers to code the *DreamSampler* onto a PI in order to facilitate making animations and film. They would go on to produce a score for a musical recording or performance, thus encouraging in a formative way the consideration, construction and application of the total sound-object. This could encourage a new set of critical thinking methodologies, potentially aiding students in the navigation of the ever-changing digital world. The educational applications of the *DreamSampler* are also appealing because of their inter-disciplinary nature; the *DreamSampler* framework links science and the arts in a streamlined way.

There is also the possibility of developing an app as a way of presenting work created in the *DreamSampler* environment. This would allow the listener/viewer to take the role of the musician in the performance with the foot controller. Each time the listener/view

interacts with the app they will design a different version of the piece – though this would take a considerable amount of work and further research to implement. The app version of the work would be a new way of presenting work; reflecting the notion of the total sound-object.

As mentioned earlier in this chapter, it would be interesting to see what results could be achieved by getting established ensembles (string quartet, big band, rock band) to perform the piece. In some respects, this seems a little against the development of a new noise, but it would be useful to have other outputs to consider. Furthermore, it seems likely that there may be other ways of practically realising the concept of the total sound-object. Continuing research in this area would be needed to uncover the specifics of these realisations.

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