# sono_morph 1-3: immersive technological DIY environments for creative sonic practice

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## ✕ ~~Abstract~~

The albums son0_morph 1-3 are the current sonic realization of 10 years' worth of performance and research: emerging from research into live improvisation with DIY hyper-instruments the current research focusses on the impact of audio monitoring and responsive systems in live and recording practices. Means of creation in recording and performance environments were explored with respect to group musical creation and the creative energy between collaborative performers. Musicians have long known, from ambient improvisation to the hardest punk, that maintaining and capturing communicative energy in the recording environment, although difficult, contributes to the vitality of musical outputs. The approaches explored here have thus far included traditional monitoring configurations, hardware-hacked instruments, generative patches, and responsive ambient looping. These question the boundaries between composer/performer/audience and probe how systems and situationally specific designs shape sonic realisations in diverse genres and styles.

***Keywords:*** audio monitoring, composition, improvisation, looping, hardware hacking.

# 1. Introduction

To register all the mercurial wit in a Haydn string quartet, or the ingenuity of a series of Coltrane solos, requires a detailed kind of attention facilitated by physical presence. (Potter et *al.*, 2012, p. 9)

In 1966 classical pianist Glenn Gould published an article titled The Prospects of Recording in which he discussed the aesthetic and technical impacts of tape editing in the recording of classical works. He presents arguments for and against editing on tape (a new process and approach at the time) and responds to the "reluctance to accept the consequences of a new technology." (Gould, 1987, p. 321) His was an advocate for the new technologies and their affordances in recording and imagined and supported potential aesthetic choices and changes in approaches to artistic realisation in this genre. From the vantage point of 2021 his advocacy was nothing short of prophetic; from the recording techniques developed shortly thereafter by the *Beatles* and Sir George Martin, to now standard applications of stage and live sound reinforcement in clubs and stadiums, and the complete pervasiveness in laptop and modular derived creative practices. Even most recently the way the musical world has pursued live streaming since Covid-19. Although Gould's optimism, and his various critics responses may now seem antiquated, now musicians across all genres seem to either embrace technological advances or to lament their impact on performance practices and modes of reception. Neutrality is not an option. The nuances in approaches are varied: many classical musicians still eschew all sound reinforcement, certain styles of jazz willingly accept sound reinforcement, but audio effects and digital technologies are frowned upon, and what contemporary musician from any genre has never complained about (or even fought about) on stage and studio monitoring sound levels?

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Criticisms and discussions around studio and live monitoring practices for musicians that take place at performances and recording sessions are a feature of any musician's daily life. From complaining about not being either able to hear themselves, or the other musicians at a gig, or having too much or too little click track in a recording session they are a feature of daily conversation, yet less is written about them in research, specifically in terms of the creative impact. This may be because their use and variation are taken to be an issue of personal preferences. Certain genres rely less on performer interaction, such as commercial studio recordings where musicians track to click independently of each other with guidance from a producer. Another example is highly choreographed contemporary performances where the live performers play to click and augmented the tracked materials – here the level of musical interaction or responsiveness between performers required is lower as the task is accurate part execution in the service of overall theatrical perfection. However, in styles that require high degrees of intra-musician sensitivity such as jazz, classical or non-click based contemporary music such as improvised rock, punk, or glitch electronica the ability to accurately hear and respond to group members is paramount.

Styles that involve improvisation require this most acutely, and arguably free improvisation most so[2], as the musical creation is the sum of responsive dialogues between contributors. Fischlin, Risk and Stewart write:

> *To play music, and particularly to improvise, is to engage with states of ongoing precarity: how, exactly, the next note will sound, or even what it may be, is unknown – until it is not, and the following note is what hangs on the knife edge. The resilience of improvisational musicians, of all kinds, in the face of the pandemic points to their disciplined acquaintance with creating on that edge. (Fischlin et al., 2021, p. 3)*

This acquaintance with the improvisatory edge of creative practice is highlighted by the pandemic as improvisers approached technologies in distinctly different ways to commercial performers. In South Africa a well-known Afrikaans pop artist presented a live television performance early in the pandemic. Having previously explored possibilities for online collaboration, I couldn't understand how this was feasible due to high latency on South African internet services, only to discover after inquiring that the performance was synchronised through a remote click track, and musicians could not hear each other in real time when playing. A server then used the click track to line up audio and video feeds, accommodating variable latency, but with the caveat that live interaction between performers was not possible. This was successful given that the genre does not require such interaction.

From this example and the binary dependencies of free improvisation monitoring environments, in design, scope, and behaviour have an intrinsic relationship with the style of work being presented and can shape the artistic output in ways that go beyond the simple confines of sound reinforcement. The interaction and dependencies between environments, systems and musical creation is not a new narrative. John Cage's 4'33'' brought this starkly into focus already in August of 1952, yet little discussion has been given to monitoring as a performance impacting ecology prior to the Covid-19 pandemic. "With Cage, the dialectical opposition of form and content disappears" (Mertens, 1998, p. 116) and with contemporary music and recording the technological means of production become part of the form, not unlike the concert hall and audience in 4'33'' blurring the boundaries between audio environments and composition. Mertens continues saying that "with the disappearance of the dialectical link between form and content, the historical category of the work is also removed, replaced by the absolute reality of the immediate experience." (Mertens, 1998, p. 116) In the case of contemporary music, where works demand, or are dependent on high degrees of responsiveness mediated by audio technologies, the role of the composer or convener of the improvisatory session must compose/design/craft such technologies in a manner equivalent to the status afforded to the components of a traditional composition. Thus "the composer or designer of that environment must also assume some responsibility for the quality of those relationships that emerge." (Kim-Boyle, 2008, p. 7).

## 2. Research Approach

The opening quote by Gann argues that the heighted focus required to perform Haydn and Coltrane (works aesthetically far from each other) emerges from or is dependent on a physical presence. But physical

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**2.** The term free improvisation in this context is used not as genus but encapsulating creative principles. Whilst free improvisation can refer to the British school of improvisors such as Dereck Baily and Keith Tippet in this context it can equally refer to post-rock such as God Speed! You Black Emperor, or Mogwai.

presence alone cannot supply the heightened focus required by these artistic endeavours, or even more so in free improvisation - mental presence, unencumbered by circumstance, goes hand in hand with successful artistic outcomes.

Consider jazz, where periodicity is defined by the harmonic form, and the expectations of a cyclical and perhaps confrontational relationship between the soloist and band is navigated through repeated extemporisations over the form. This speaks to a specific type of physical and mental presence on the part of the performers, where the soloist is objectified and/or critiqued from a display of power encased in the complexity of a solo emerging from harmonic and modal complexity. In popular music, form emerges from the narrative content and the conventions that shape this presentation, setting up expectations of duration, form and periodicity which shape our reading of the event, and expectations of the event, textually, culturally, and structurally. They are a grammar with which we are extremely familiar due to omnipresent exposure, and the anticipation of the shape and duration of this presentation forms a cocoon around which the receiver and practitioners can scale and adjudicate their responses and aesthetic critique.

These descriptions imply extremely different types of physical and mental presence on the part of artistic practitioners, and the various performance practice conventions that, whilst common within genres, may be wholly unaware to participants during execution. Lashua and Thompson's earlier referred research into recording studio myths supports the and, in their research, they challenged "romanticized representations of studios as individualistic spaces and highlight(ed) how mythic representations of creativity influence musicians' technical expectations of recording processes." (Lashua & Thompson, 2016, p. 70).

The projects under consideration here were expressed through a range of performances and recordings and applied different audio, stage, and studio configurations to each artistic event. They were conceived with an awareness of the musical interests and skills of the various musical contributors aiming to foster their creative leanings. Other looped and generative elements were prepared for each session, which were linked to these same artistic impulses, and provided a unique sonic signature for each event.

Given the creative role participants play in exploring their musical environments, the role of the composer has largely become transformed to that of designer while the traditional role of the performer has been subsumed by that of player. To a certain extent this situation is paralleled in traditional open form works in which composers design open musical environments which serve to facilitate an awareness of process and collective becoming. (Kim-Boyle, 2008, p. 7)

The range of performances and recordings considered here span a decade but are linked through an explorative and iterative approach to the system development. Each performance/recording was designed with a specific audio ecology, sometimes wholly focused on performers, and sometimes exploring tensions which included audience, notational practices, randomised audio manipulation, generative patches and hardware hacked instruments. The framework used is that of research in and through musical practice (Crispin, 2015, p. 58) where the events locate "reflexion, the contextual information and the musical practice within a rigorous methodological framework." (Crispin, 2015, p. 58). The research objective repeatedly explored throughout these research events asked how a system design can: a) afford better creative dialogues between the improvisors, b) do so in ways that are pragmatic and do not overwhelm the participants leading to disengagement, c) are unique to the collaborators/event sufficiently to encourage maximum participant contribution and d) to do so in some ways that suggest an additional 'presence' within the improvisational event where the system appears to have agency beyond the performers. Category d) is at once the most intriguing, as well as the most difficult to achieve and has only been observed in a select number of instances where collaborators either respond to machine interventions, or retrospectively recall responding to these interventions in an anthropomorphic sense. Each event is then recorded, and mixed so that further consideration can be given, via listening analysis, to adjudicating which elements were effective and which were not.

## 3. Design of the Projects

Whilst the Son0_Morph albums series, from which this paper takes its title, were all released in 2021, the research and creative practice that led to this most recent work began in 2011. The first performance considered here was the initial performance in a PhD research project, the Cyber-Guitar System[3], and although contributing

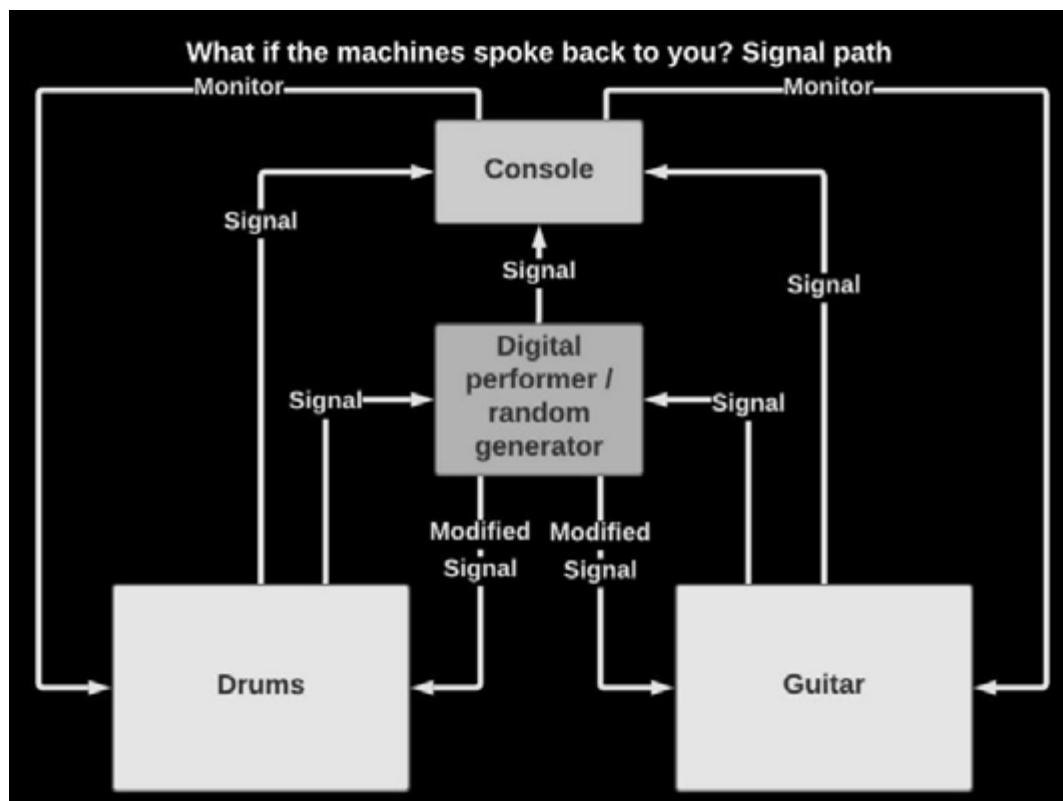**3.** The Cyber-Guitar System was presented at KISMIF 2015.

in other ways to that research the monitoring and generative elements were not specifically pursued again until 2015. Each of the projects presented below represent iterative parts of the evolution of the monitoring approach with an increasing focus on the individual artistic and aesthetic leanings of the various practitioners involved. Apart from the recording *3 Cities* all projects discussed here are available on streaming platforms, with the addition of a video recording of The Settlement.

## 3.1. What if the machines spoke back to you? (Badenhorst et al., 2011/8)

In 2011 I presented a performance with drummer Justin Badenhorst and digital artist Jacob Israel. Whilst this performance formed part of a PhD research project the nature of the performance audio ecology differed from the PhD research and was only revisited after that project was conceptually completed. This concert was fully improvised, with the responsive / randomised system and audio routing configurations receiving focussed rehearsal time.

In this configuration the drums and guitar were fed into a Logic Audio based system designed by Israel. Israel designed elements that were both responsive, randomised, whilst also generating materials of his own. They captured and processed elements of the live performers and delivered these into the overall audio mix as well as in randomised ways to the audio monitoring.

This work was significant as all three performers shared the experience of being unable to ascertain who was producing audio material during sections of the work, with the drummer and the guitarist often pausing in response to this. The audience reception of this work was extremely warm, silent at moments and jubilant at others as the performers patiently navigated this flux in agency and sound generation.
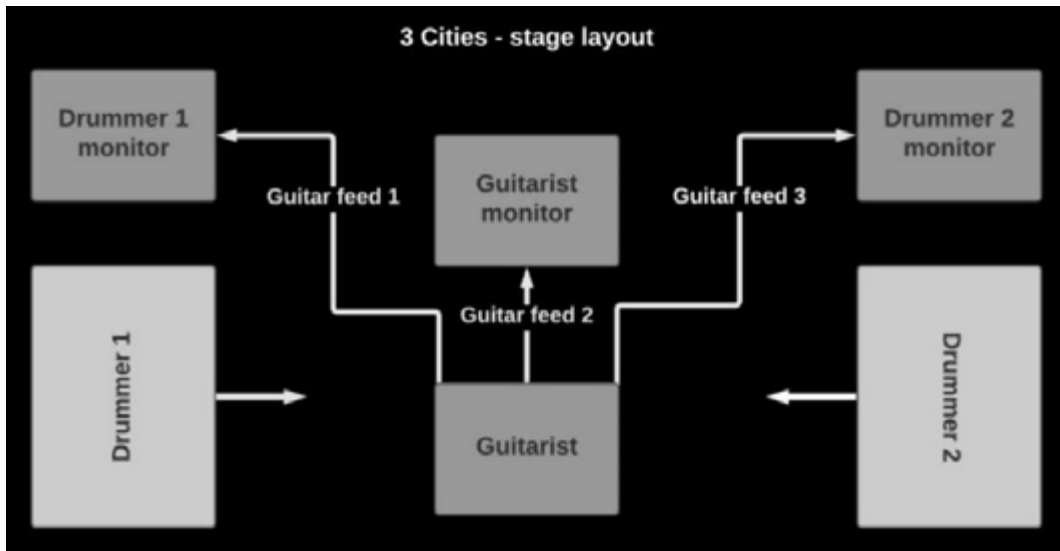


▶ Figure 2.2.1. - Signal path for What if the Machines Spoke back to you? 2011
▶ Source: the author.

## 3.2 Three Cities (Crossley et al., 2015)

For the improvised performance titled 3 Cities stage the guitarist (Jonathan Crossley) was placed in the middle of the stage facing the audience, with two drummers (Lukas Ligeti & Jonathan Sweetman) facing each other on either side of the guitarist and the audience seated in a conventional manner. The Cyber-Guitar System had three separated outputs, sent to three separate monitor speakers with each monitor feed assigned to a separate performer. The three guitar outputs were not duplicated signals, rather the drummers and guitarist heard significantly different versions of the guitar sound and loop elements, with some elements shaped

through distortion, ring modulation, various degrees of pitch shifting and non-synchronised delays. Each signal path contained a dedicated looping system, whereby un-synchronised live loops and tempo-based effects elements were fed to the separated monitors. Although the layout of the stage provided enough acoustic proximity for the drummers to communicate with each other, the ambient volumes separated the monitoring experience of the electric guitar signals from the performers. The drummers were not made aware of this fact and the musical performance contained dialogues between elements that were heard by all, as well as elements that were results of affordances given to materials that were not fully distributed to all members. Given the proximity of performers and the somewhat adversarial position of that the drummers the tensions in the dialogue provided much energy to the performance.
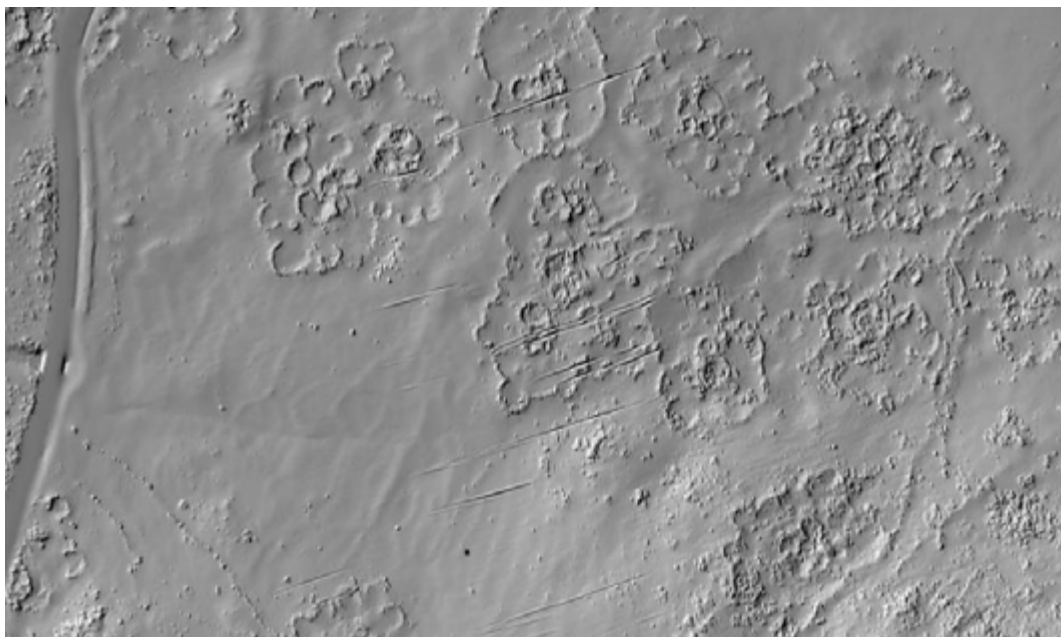


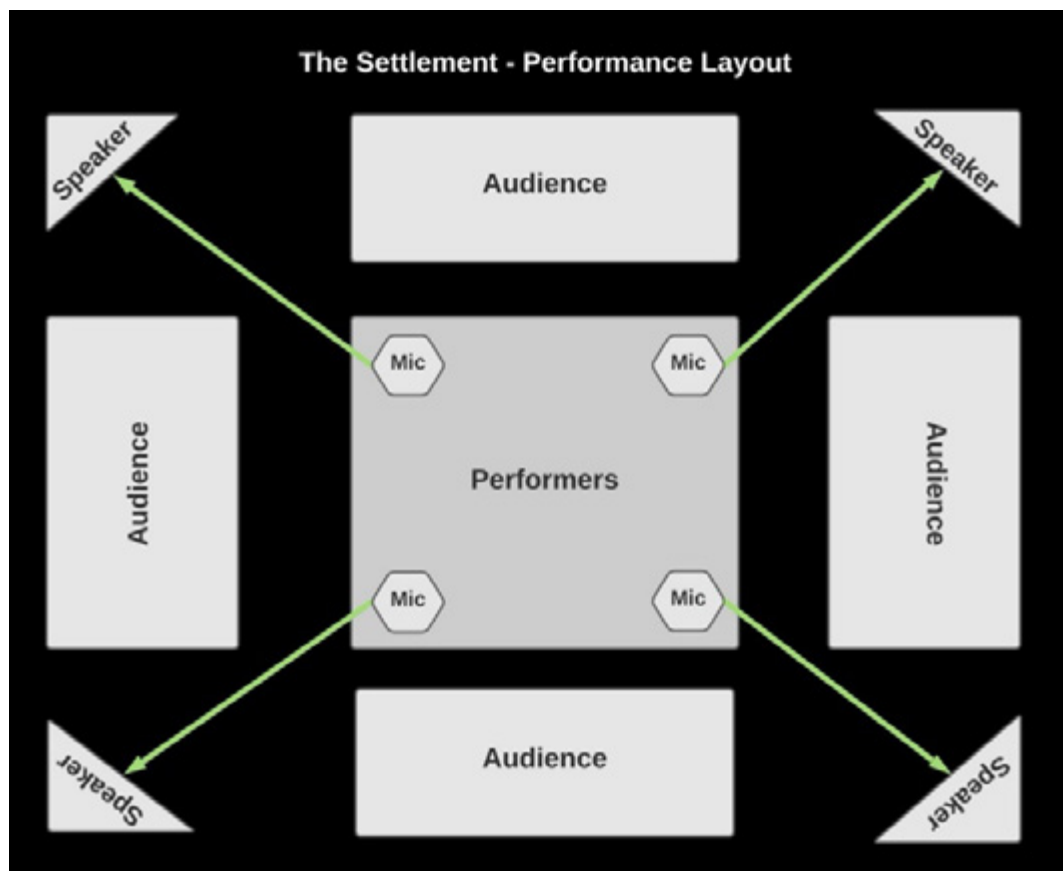► Figure 2.2.2. - Three Cities Stage plan, 2015
► Source: the author.

## 3.3 The Settlement (Crossley & Molikeng, 2017)

The Settlement (May 2017) took an immersive audio approach as core to composition and was a collaboration with African instrumentalist, Mpho Molikeng & Karim Sadr from the archaeology department of the University of the Witwatersrand. Sadr's team had recently used LiDAR technologies to "rediscover a southern African city that was occupied from the 15th century until about 200 years ago." (Sadr, 2018, n/p).



► Figure 2.2.3. - LiDAR image of Tswana settlement
► Source: courtesy of Professor Karim Sadr

The approach taken to this performance was to 'read' the image as a type of musical score, shaping the musical improvisations and the structure of the event based of narratives of daily life in the settlement, as imagined and conceived by Molikeng. Alongside this musical shaping the physical shape of the settlement was mirrored in the layout of the venue, and the design of the supporting audio system. The audio, performance and monitoring systems were designed to create an immersive experience for the audience where the performance would be situated in an imagined centre of the settlement, with the audience surrounding the performance area.
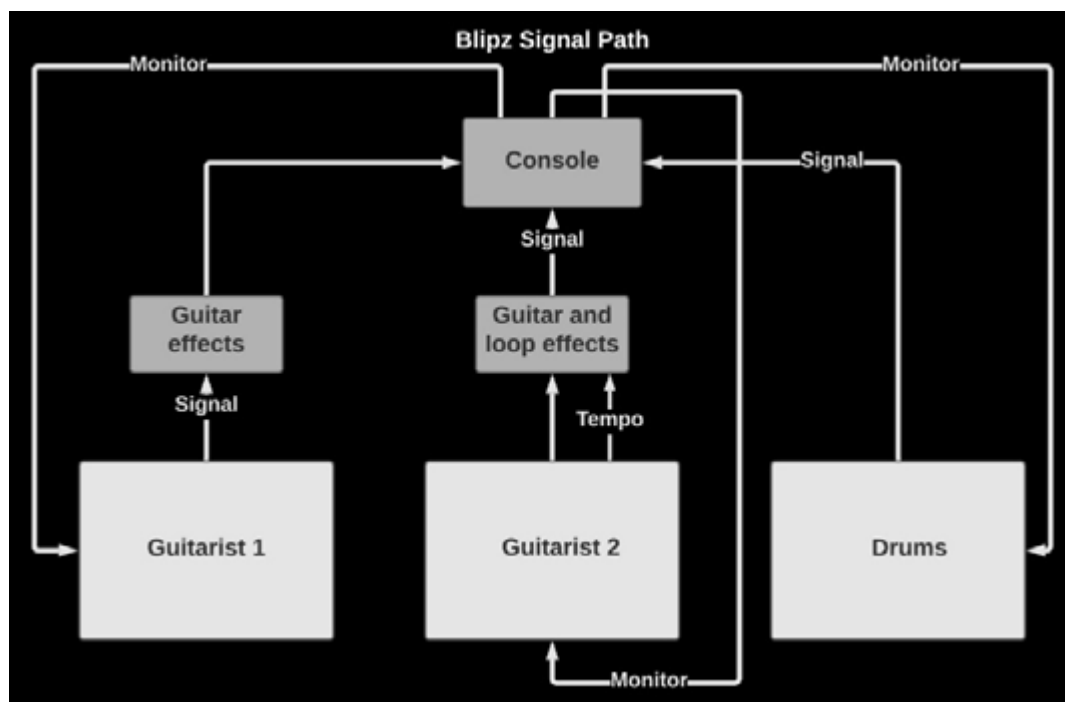


▶ Figure 2.2.4. - Signal path for The Settlement, 2017
▶ Source: the author.

Lashua and Thompson's research into the myths around music creation in recording studios notes that the recording studio has "an inherent relationship to Romantic ideas of creativity" and that "rather than placing the individual at the centre of creativity and the creative process" creativity is a "convergence of multiple factors." (Lashua & Thompson, 2016, p. 71) Although *The Settlement* was a live performance this environmental description of the recording studio with its ecology mediated through recording and audio technologies is analogous with the type of immersive performance approach taken for The Settlement, rather than any traditional audience facing event. Although 4'33'' might have brought the audience and environmental audio into stark sonic focus, The Settlement places the audience, performers and in this case the LiDAR memory of the past into an idea of creativity that creates a similar convergence with multiple factors. The performers here share the audio environment with the audience immersed into the re-imagining of the space, as was implied by, or derived from the archaeological research, and as such no proximate on-stage monitoring was used.

## 3.4 Blipz 2017/18 (Crossley et al., 2018)

Later in 2017 a studio recording session was convened in Cape Town, South Africa with guitarist, Reza Khota and drummer Jonathan Sweetman. For this project the recording session and accompanying Ableton Live system were designed around the musical leanings of Khota and Sweetman. The music recorded on *Blipz* was again completely improvised, however the prepared elements consisted of generative loop materials designed to excite or stimulate the artistic interests of the drummer. Sweetman's playing style can be dense, yet almost hyper-aware of collaborators rhythmically, whilst Khota's guitar style in 2017 was extremely dry and sonically insistent.
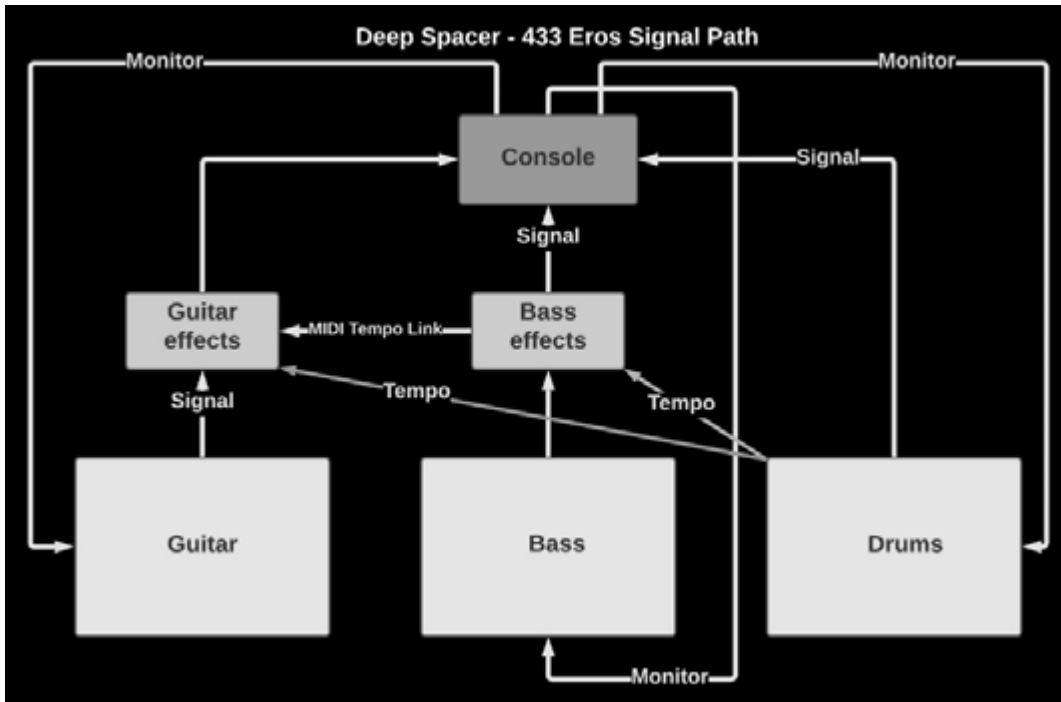
**Blipz Signal Path**

► Figure 2.2.5. - Signal path, Blipz 2017
► Source: the author.

In this diagram Khota is guitarist 1, guitarist 2 is placed in the centre and responds to the first guitarist and drummer by adjusting and modifying pre-prepared elements based on the level of engagement. In comparison to The Settlement there is no text being read, nor a narrative such as the imagined activities implied by the LiDAR imagery. Rather here musical collaborators are responding to each other, and the various signal modifications that the system creates, with the foreknowledge of performer musical preferences forming the compositional impetus for the system designs and degrees of audio responsiveness. The recording is available on all streaming services and in the title track, *Blipz*, (Crossley et *al.*, 2018) one can easily hear the performers energetically responding to each other and the Ableton elements.

## 3.5 Deep Spacer – 433 Eros, 2020 (Cassarino et al., 2020)

The post-rock trio, Deep Spacer was formed in 2017, but musically flourished in 2018 after a small change of line-up. The group's works are heavily effects layered and feature Jonathan Crossley on guitar, Cesare Cassarino on bass and Etienne Oosthuysen on drums. During 2018 Deep Spacer moved from rehearsing and developing compositions in a traditional manner, towards an iterative approach to systems development instead of compositional material. The group intentionally committed themselves to 'non-composition' in the rehearsal space. The artistic goal was to pursue and integrate the responsiveness and inter-musician musical dependencies of free improvisation (in the spirit of AMM, Fred Frith and others), integrating these within tempo based musical genres. ** Effectively asking how one can free-improvise whilst honoring the stylistic confines of more rigidly tempo-based genres such as post-rock, dub, and glitch.

This was achieved by locking each musician's tempo-based elements together, both in Ableton (software) systems and physically linked hardware elements. The decision was taken to give a master tempo control for the environment to the drummer, so all members tempo-based parameters were seeded to this control using a midi trigger.
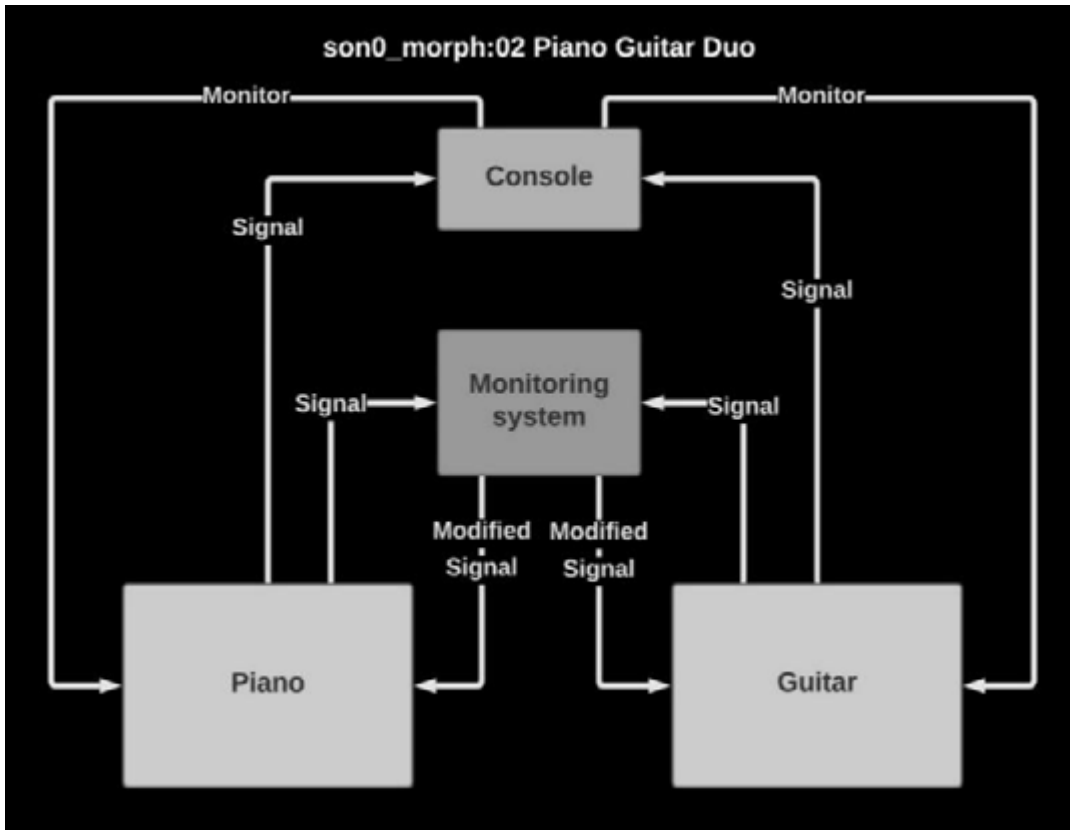
▸ Figure 2.2.6. - Signal Path, Deep Spacer, 433 Eros 2020
▸ Source: the author.

It may appear that these monitoring, generative and responsive configurations may seem simple when compared to complex configurations of network-based practices and other more complex hyper-instruments, however, the research presented here argues for approaching each performance or recording event with an acute consideration as to the specific musicians engaged and the development of materials and systems unique to specific circumstances. An iterative approach to finessing the development and deployment of systems is encouraged alongside an intentionality that emerges from a concrete set of goals analogous with the practice of composition and improvisation as espoused in the works of Cage, Cardew, AMM and others. It is the experience of this writer that many technologically innovative systems, well beyond the complexity of the designs mentioned often seem to overwhelm the participants in ways that lead to reduced communication between musical participants. The systems, by virtue of their technological complexity and artistic formulations, carry an aesthetic and intellectual weight that can be argued as separate from the sonic realisations and musical relationships that may be generated. This area of research has sought to match the collective improvisational interests, aesthetics, capacities, and desires of recording and performing collaborators in pragmatic ways which lead to enjoyable and arguably successful creative events. Thus, the signal path design for the Deep Spacer project is responding to the preference towards tempo-based playing on the part of bassist Cassarino and drummer Ooosthuysen whereby the design disappears in the moment of creativity rather than the complexity reducing communication.

## 3.6 Son0_Morph: 02 Duo, 2018/2021 (Crossley & Tagg, 2021)

The Son0_Moprh series of four albums were released in 2021 and were variously recorded between 2018 and 2021. Of the four recordings two are considered within the scope of this paper, 02:Duo and 01:Trio The duet session with pianist Kathleen Tagg was recorded in late 2018 and featured a specifically designed session tailored to Tagg's use of extended techniques on the piano. Techniques used include prepared piano elements such as percussive objects inside the piano, muting of individual notes whilst striking the keys, plucking, and strumming the strings and using horsehair from bows to activate specific notes. The approach to the session was to record the piano using a traditional configuration of spaced pair microphones with a closer microphone set being fed into an Ableton session, and modified elements returned to the headphone monitoring mix.
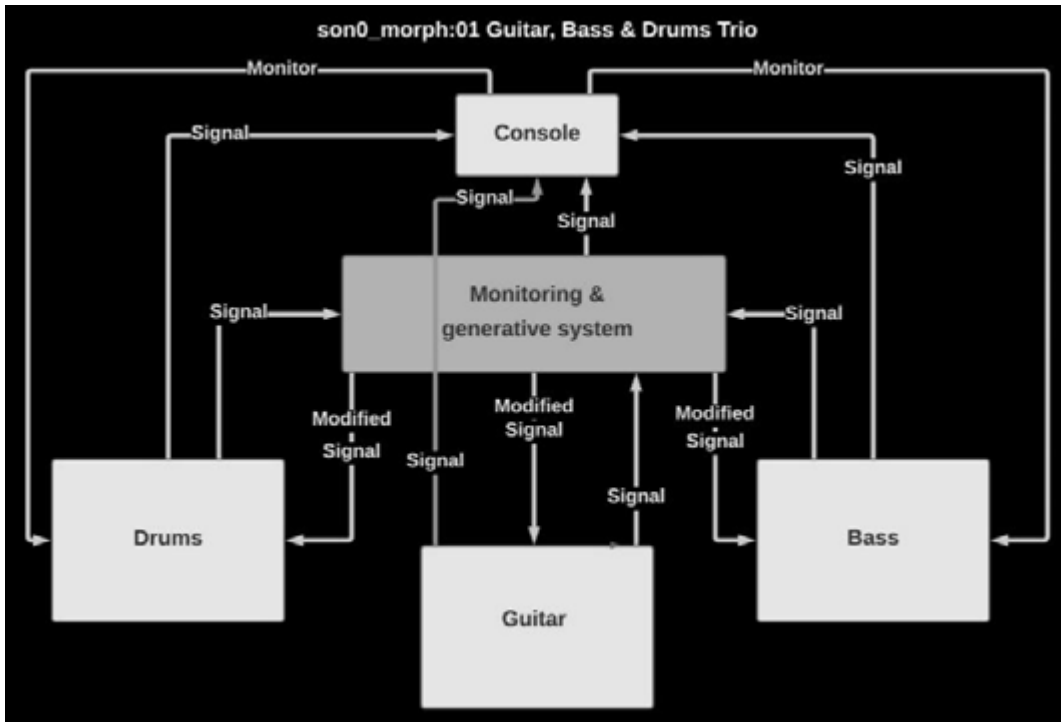
▸ Figure 2.2.7. - Signal path, Son0_Morph:02 Duo
▸ Source: the author.

The success of this configuration can be heard in the composition Bells, (Crossley & Tagg, 2021) from the albums, where two thirds into the piece earlier fragments of Tagg's piano work return pitched up and sped up, and the performers can be heard to pause for a moment before allowing this material (from which the track takes its name) to change the musical direction of the composition altogether. Reflection on this recording event shaped the design of the following sessions with pursuit of similar sonic interventions, accidents and generative elements.

## 3.7 Son0_Morph 01: Trio, 2021 (Crossley et al., 2021)

This recording session was proposed for December of 2020 during a small window of relaxed restrictions before the second wave of coronavirus in South Africa. The restrictions at this moment allowed for the hiring of a recording studio and a system was designed with the three performers in mind. This session featured South African composer and bassist Carlo Mombelli as well as Jonathan Sweetman on drums. Although I have worked extensively with Sweetman since 2007, he and recently begun working with Mombelli and recordings of the communication dynamics between Mombelli and Sweetman were available for consideration during the system design process. Mombelli's most recent compositional and bass work has featured melodies composed in a rubato style often followed by repetitive bass groove patterns with non-symmetrical minimalist styled unison figures and improvisations. The system design for this session paid tribute to these elements by including non-symmetrical generative looping elements using Native Instruments Reaktor and other MAX4Live objects. These were created in response to communication dynamics and the hope was that they would allow the session to capitalise on existing dialogues between bass and drums.

> Figure 2.2.8. - Signal path for Son0_Morph 01: Trio
> Source: the author.

A hardware hacked Suzuki Omnichord and an erratic dual delay box were added, both of which brought an unpredictable ambient sonic element which ran as a contrast to the tempo linked generative material from Reaktor and MAX4Live.  In the diagram these items are collected under what has been named 'Monitoring and generative system', where the generative elements, unpredictable hardware hacked elements and looped and modified performer signals are represented.

This session represents the most complete combination of generative, monitoring modifications and signal paths that are specifically designed/composed with performer awareness. From the accounts of the performers and engineers this recording was an enjoyable and unique event. I recall a moment where Sweetman, eyes closed and smiling was dialoguing/improvising with modified versions of his own playing recorded and looped back from earlier – in effect dialoguing with a digital transformed representation, viewing his own practice through the mirror of the machine.

# 4. Conclusions and Future Directions for Research

The Son0_Morph series of albums have explored, with intent, means of heightening dialogue and supporting creativity in free improvisation through targeted systems designs, thereby creating unique audio ecologies applicable to a gathering of specifically chosen musicians in either performance or recording circumstances. This project evolved out of observations made during the development of the earlier, and for a period parallel, Cyber-Guitar project. Some of the observations of difficulties or failures during the Cyber-Guitar project shaped and propelled the current research. It was observed during a central Cyber-Guitar event in 2014, that the complexities of the system, staging, notation and audio configurations undermined the improvisation to the detriment of the overall performance and reduced participant communication. Thus, the albums and performances presented here are iterations of approaches that continue to evolve in pursuit of better communication concurrent with sonic immersion and innovation. The most recent recording, Son0_Morph:01Trio exhibits the most technological complexity, whilst most effectively dissolving into the musical event. The research stance of this project is clear, that communication remains the central goal of the creative engagement and systems development.

Much current popular press has been given to improvising and performing over the internet since the beginning of the global pandemic, however research in this area has been extensive for the past two decades. Roger Mills' work on improvisation within networked audio platforms is optimistic for collaborations across cultures in ways that could not be afforded by existing practice (Mills, 2010). He also argues, as discussed earlier, that there is interest in the composer assuming the role of (system) designer. The designer, as composer, owes

a debt to past composers such as Cage and Cardew who although not approaching the topic technologically did bring the focus onto the agency or presence of composers, performers, audience members and so forth. The advances in networks and network-based performances and collaborations are "a natural response to the musical and social ideals that motivated the work of an earlier generation of composers for whom such technology did not exist." (Kim-Boyle, 2008, p. 7) Kim-Boyle further elaborates that these bring about "new modes of awareness" and a focus on the engagement of individual actors and collaborators withing a given system. The Son0_Morph series and the preceding creative events leading up to these albums approached these technologically mediated events through the lens of engagement and member attunement taking the position that heightened attunement and evidenced engagement between players is evidence of successful realisation, pursuing a "collective transparency of sound where each part is discernible." (Seddeon, 2005, p. 49).

Further creative practice and research will be pursued in a mixed approach using live performances, recordings, and networked events. A design in development is looking at the possibility of tempo-based practices, such as those in Deep Spacer, being deployed where tempo collaboration love over the internet is achieved via tempo variations calculated using multiples of server latency.

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