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VIDEO GAMES AS DIGITAL AUDIOVISUAL PERFORMANCE

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Video games are an ideal medium for creating a live-cinema experience because of their potential for cinematic narrative and their open structure. 'Performing digital media' as opposed to 'performing with digital media' or using digital media in performance means to 'play the media' like a musical instrument as much as possible. This is to be able to control and finely nuance the audiovisual and kinetic data stream through live manipulation, and/or to respond instantly to this, on stage. This is, in a sense, to grant the performance an immediacy that belies remediation. This paper looks at recent instances in which as the media itself is being performed, a similar audiovisual contract to that of cinema is being entered into by an audience. Thus, the performance or live event itself, becomes a product of media technologies, yet is indistinctly unified with them.

1.INTRODUCTION

The use of digital technology to enhance music performances or audiovisual shows has become widespread at least since the 1990s. The Internet, for instance, became a prime motivator for networking audiences with artist performers, and extending the idea of what art installations could become. Non-linear video playback systems began to emerge and be accessible, the CD ROM as a medium arguably had its heyday and video games became faster and richer.[1] MUD (Multi-User Dungeons) and MOO interactive scenarios (Online virtual reality systems like MUDs but using object oriented techniques) seeded what would later become MMORPGs. Performance artist Stelarc conducted on himself cyborg-like experiments and other artists experimented with embedding computer chips in their bodies (Dixon, 2007, pp. 1-3). The 1990s could arguably be the decade when digital means began to truly permeate the world of artistic performance. Even when the visuals are not essential to the piece, music may often be played with accompanying video or digital graphics and lighting. Yet, what was once a supplementary element is frequently now central to performance as we find ourselves often intervening or affecting visual media in real time as part of what may formerly have been a music-only performance. Video game worlds or 3D digital scenarios are arguably an ideal partner to sonic media, yet as composers we have done little more than modify either one while triggering the other. What if we could place ourselves in the situation where both the visual discourse and the music embark on an expressive, and possibly narrative, journey with or without a known destination?

The question that this paper intends to examine goes beyond describing the rise of digital media on stage, it aims to question how, and if, digital multimedia can itself be performed. This appears to be a simpler question than it is. The 'triggering' style workflow of digital media, where pre-fabricated elements are played back at different points is fairly common today. This is understandable as sensors, machine listening and computer vision are relatively recent developments. For instance, capturing or scanning movement in 3D is really just beginning, with the *Kinect*[2] motion sensor being less than five years old at the time of writing and similar systems like the *Leap Motion*[3] just starting to scratch the surface of gestur-

1 Meaning that the load times for levels became substantially reduced and the media interaction has become richer as can be seen from the development of dynamic music responses to gameplay.

2 For more information on this controller access this URL: *http://www. xbox.com/en-GB/Kinect*

3 For more information on this controller access this URL: *www.leapmotion.com*

al control.[4] The fact is, that computers are still struggling to efficiently follow a human performance (or we could say that programmers are still struggling to account in code for the rich nuance of live performance situations!).

What does it mean, then, 'to perform digital media'? as opposed to 'performing with digital media' or using digital media in performance? In this paper, I would like to propose that it means to play the media like a musical instrument as much as possible. This is to be able to control and finely nuance the audiovisual and kinetic (if implemented) data stream through live manipulation, and/or to respond instantly to this, on stage. This is, also in a sense, to grant the performance an immediacy that belies remediation, and while this can be said of computer system virtual realities (Bolter & Grusin, 1996), expressed through 3D models and animations,it is a relatively new practice in musical performance. My aim in this paper is to look at recent instances in which as the media itself is being performed, a similar audiovisual contract (Chion 1994) to that of cinema and TV is being entered into by an audience of a digital audiovisual performance. Thus, the performance or live event itself, becomes a product of media technologies (Auslander, 2008), yet is indistinctly unified with them.

In particular I would like to examine two works that require a video game to be performed, not merely played, in front of an audience as one may find in video game 'championships' like the ones that take place in Korea (*World Cyber Games*, 2013). The first work we will look at is *Ho – a sonic expedition* (2008/9) by Spanish composer Ricardo Climent. It is intended to be a 'navigation through sound' video game with optional live music improvisers' interaction. The second work is my own *Terra Nova First Person Concerto* (2011) for video game player, laptop artist(s) and rag-tag ensemble in five instrumental ranges. I revised the piece in 2013 with the use of Walter Thompson's *Soundpainting*, a multidisciplinary sign language for live composition created in 1974 in Woodstock, New York (Thompson, 2014).

At this stage it is important to point out that I view both works as experimental artefacts for understanding digital audiovisual performance and that this paper is not an apology of the creative work that they present but rather an enquiry into what may be profitably shared from these experiences for other musical new media

4 Both systems are based on motion sensing technology using a combination of infrared cameras (on the *Leap*) and range camera technology plus infrared on the *Kinect*. I have no deeper understanding of the technology but there are ample sources on the web if you wish to learn more, as well as several Processing language sketches for grabbing the data stream of the Leap Motion, which is as far as I have gotten with it.

practitioners to learn from. For this reason I will attempt an overview of each piece, highlighting potentially interesting contributions and giving analytic insight. Finally I will summarise the emerging themes of this paper.

So, what does it mean to perform a video game? It means that the game-specific iterative sequence[5] of exploration, discovery, challenge and outcome (success/failure) is affected by the presence of an audience to whom it must be made explicit and dramatised. Because of this, actual game success becomes secondary to the simulacra of victory and failure. It also means that other performers, musicians in this case, are able to interact (by immediate reaction or causation) with the video gameplay.

2.HO - A SONIC EXPEDITION

Ricardo Climent is essentially a musical new media[6] artist who works at the University of Manchester, where he lectures in music composition, Climent's work tends to employ custom made systems to create works exploring dynamic music scores, geo-locative sound walks, installations and other collaborative environments. One of these environments is a 3D video game world where sound is featured as a key element called *Ho*. I became interested in *Ho*,[7] a piece originally intended as an interactive sound installation where visitors could embark on an "imaginary sonic expedition to Vietnam" (Climent, 2008). The user navigates various 3D environments by steering a wheel which is an interface to a digital helm that guides an animated ship (fig. 1)

The structure of *Ho* is in a sense aleatoric since one can choose from different 3D environments to traverse using the sound-navigation tool, yet they all share the 'basic promise'[8] of the game, which is that you will find your way around, or simply explore them by following sound cues. The 3D environment quickly becomes visually redundant, everywhere you look is similar, and the user is forced to concentrate on the sound to navigate. Audio cues are triggered by collisions in the 3D space or, as in the case of the radio, by tuning the radio-frequency dial.

Ho, has the following game environments or levels:
• a rickshaw maze (the user is on a rickshaw inside a temple which is in fact a maze)
• a zebra crossing (the user must cross a dangerously busy street in Ho Chi Min city)
• a kitchen party (the user is in a restaurant where

Fig.1 Climent at Manchester University with the prototype navigation system for *Ho* (2008)
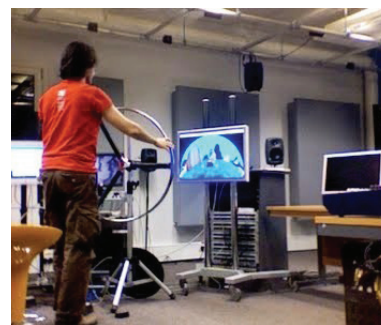
5 This is my own description of gameplay, although I don't imagine it to be very original

6 Partly in the sense described by Cook (2001) when explaining musical multimedia (multimedia where music leads formally) and partly in that his work can be described as 'new media' according to Manovich (2001) or work that is numerically representable, modular, automated or algorithmic, variable and culturally transcodable.

7 A demo can be accessed at *http://vimeo.com/6766860*.

8 As in a 'promise' to the consumer, to use the language of advertising media.

sounds are made by colliding against doors and curtains and other objects)
- Radio Ho (a 3D radio which the user explores by tuning it)
- Water puppetry (a puppet theatre on a lake)
- Labyrinth Island (the user navigates a ship through an archipelago, making sound as it collides with floating balls)

The distinctive feature about *Ho*, is not in fact the use of an alternative controller to explore sound or even 3D environments, it is its public performance. And, arguably, that is not such a novelty either yet what is interesting to me is Climent's recent use of live musicians to function as a sort of 'concertante versus ripieno' ensemble with the videogame navigator. I would say this is an instance of live adaptive video game music.

There is a history of video games where music is the key element and these are explored in a recent article on the rewards of musical video games (d'Escriván and Collins, 2011). The most notable were *Guitar Hero* (2005), *Electroplankton* (2005, for *Nintendo DS*) or , at the time quite novel, *iPhone* mobile applications like *Smule's Leaf Trombone* (2009), and of course, *Rez*[9] (2001). For more on musical interfaces to games see Blaine (2005) Pichlmair and Kayali (2007) and the now obligatory reference which is Karen Collins' book on game sound (2008). Traditionally, albeit their rather recent history, video games have aims and objectives that relate to reward structures in ways that are now fairly established; the music, functions in a diegetic way yet the game does not yield any musical structure per se. In the particular case of musical video games, ranging from the very loose *Elektroplankton* to the very tightly rewarded *BIT.TRIP* (2009) series, 'success' is measured through a wide variety of musical results that aim to conform with some kind of musical structure (d'Escriván and Collins, 2011).

What is of interest to me is not just the use of music as the key incentive for the gameplay as can be appreciated in the work of Rosenstock's *iGotBand*, where avatars are accompanied by representations of 3D note sequences which they must play correctly to win fans (Rosenstock, 2009). Or even, the use of game music in concert[10] (as has been popularised by composers Tommy Tallarico and Jack Wall in their *Video Games Live Series*[11]). What is truly interesting to me is the video gameplayer as performer within a hybrid ensemble of musical instruments and

[9] The most comprehensive information about this now discontinued game can be found at wikipedia, video sequences of the game can also be found on youtube but the game is no longer current. <*http://en.wikipedia. org/wiki/Rez*>

[10] Which to me is a mistaken approach to lending artistic credibility to the music, as it divorces it from what makes it a distinct and specific art form, the game context.

[11] more details here: *http://www. videogameslive.com*

digital machines. This renders the video game into a musical instrument of sorts, as it plays a lead musical role.

Using three environments from *Ho*, *the Labyrinth Island*, *Radio Ho and the Rickshaw Maze*, Climent has explored these issues by briefing an ensemble of improvising musicians on how to react to the sounds produced by the gamer. Sounds produced by collisions or manipulations (as in the case of Radio Ho) in Ho are categorised and retrieved following a logic that relies on grouping them according to their acoustic features or typo-morphology (Climent, 2008). The live players are instructed[12] to improvise on the basis of these features as the sounds are triggered by the game player. In this manner, if sounds have short attack amplitude envelopes, for instance, the players will respond with freely pitched sounds or even noises that share this feature. Although this seems like a simple proposition, the variety of instruments present and the interpretations of the musicians, makes for a rich and variedly detailed musical experience as the lead instrumentalist (the game player) navigates through the 3D environments uncovering sound cues.

The scenes in *Ho*, as mentioned earlier, use visuals that quickly become familiar to the player, and there is no real success or failure in the game. So, the musical performance could be described as non-teleological. In a sense it is closer to free improvisation where the lead status of any instrument changes from moment to moment without obvious preparation and with no real overall structural consequence. In this sense *Ho* is closer to, say, *Elektroplankton* although it results in far more unpredictable musical results. For example, the collisions in the latter's *Luminaria*[13] level are very pattern-based while the ones in the *Hanenbow* level where spheres bounce from leaves and fall into the water in a similar fashion to *Ho*, use timbres that are uniformly bell-like and potentially monotonous.

Although *Ho* was not primarily intended as a musical ensemble piece, it lends itself very well to it and it is a credit to Climent's imagination how successful the performance can be. Arguably, it shows that the video game itself can become a musical instrument and the player can become a performer.

12 I know this from private email correspondence with Ricardo Climent, as well as having been at one of the performances

13 A demo video of Elektroplankton can be seen here: *http://www.youtube.com/watch?v=d3v6npP8OZk*

3. TERRA NOVA FIRST PERSON CONCERTO

While the player is a performer within an ensemble when *Ho* is performed live, in *Terra Nova* the role of the player is to be a protagonist investigating the 3D world from a first-person video game perspective. In *Terra Nova*, the player guides the diegetic and non-diegetic functions of the music in a manner more akin to how music is used to accompany silent film.

Improvising to picture is almost a traditional practice. In the early days of cinema, pianists and organists would improvise to film, illustrating the story on screen and at times going so far as to create sound effects through musical stylisation 'on the go'. At other times they made use of extensive music libraries like the *Sam Fox Moving Picture Music* library to select appropriate themes to cre-

Fig. 2 Performance of Terra Nova at West Road Concert Hall, Cambridge, UK

ate moods, or improvise on, or sometimes these selections were prepared for them especially as cue sheets for specific films (Cooke 2008, Cousins 2011, McDonald 2013). Although this practice all but died out with the advent of sound on film, at various times and to this day, composers and improvising performers have been fascinated by this type of audiovisual performance in which musical instruments give voice to the image. *Terra Nova* is an attempt to translate this practice to the video game experience, turning it into a performance and adding the uncertainty of the video game narrative.

Terra Nova was written to commemorate the 100th Anniversary of the expedition led by Captain Robert Falcon Scott to the South Pole, effectively racing Norwegian Roald Amundsen and his team to get there, which ended in the death of Scott and four of his crew members. The piece calls for up to four laptops in charge of foley, atmospheres and electroacoustic music and an indetermi-

nate ensemble including instruments from five ranges (Bass, Tenor, Alto, Soprano and Very Soprano) and Piano and drums. Matt Hollis created the video game[14] and he played it at the first performance at Cambridge University's West Road Concert Hall in November of 2011.

The video game was structured by broadly following the narrative of Apsley Cherry-Garrard's book on Scott's journey (Cherry-Garrard, 2010). Cherry-Garrard was the youngest member of the expedition and not being one of the final crew to attempt to reach the South Pole, survived. In his book he chronicles the preparation and crossing from England to Antarctica via South Africa and New Zeland, the landfall and preparation of supply depots, a winter expedition to find Emperor Penguin eggs, the spring season and the Polar journey.[15] To illustrate these key periods of the expedition, I created four cutscenes for the video game and Matt Hollis created three levels with simple yet well defined objectives. These are illustrated by Table 1.

14 A student of music for digital media whom I motivated into video game engine programming and who exceeded my wildest expectations in responding very professionally to the brief of creating the polar landscape and a game environment.

15 The chronicle is far more detailed than this but these are the sections used in the Terra Nova piece

Table 1 overall structure of *Terra Nova*

Section	Theme	Game object-tive	Musical material	Electroacoustic Material
Cutscene 1	The Crossing	-	Piano vamp plus melodic variations (see fig 3) on all instruments that concludes with a beat coordinated minimalist construction	Laptop(s) provide sounds of the sea, whale singing, various drones and excerpts of partly scrambled radio transmissions and Morse code
Level 1	The Depots prepara-tion	find 3 depots and leave a crate	A basic march pattern is used as a Sound-painting palette (musical material to be cued as appropriate)	Laptop(s) only play sounds of wind, sparsely just to accompany the narrative overall., plus sounds plunging into water and of water laps
Cutscene 2		Winter	-	Double Bass solo improvisation responding to the concrete sounds of the laptops
Level 2	Winter expedition to collect penguin eggs	Collect 3 eggs	Ostinato instrumental patterns with crescen-dos and ascending arpeggios.	Lt1 and Lt2: choose a note every time and play with a very low drone sound, add delay and a nice long reverb. Lt3 and Lt4: create the Foley, including wind and the crashing of rocks falling, etc.
Cutscene 3	Spring	-	Very-Soprano improvisation	Laptop(s) is (are) guided through a process of selection of loops within their samples and they are shortened until granular textures are created. A metaphor of ice breaking and liquefying.
Level 3	Final journey	Find the south pole	Beat-coordinated crescendos as a sonic meta-phor or anaphone to the snow blizzard (for more on anaphones, see Tagg 2012, p487)	Granulations become 'blizzards' through the careful use of amplitude envelopes and live mixing.
Cutscene 4	Monu-ments	-	Chorales created from sets of notes show as chords for each range	Laptop(s) introduce(s) rumbles, low trans-posed sea sounds, and slowed down sounds of water as well as wood creaking sounds from their sample sets.

Given the unpredictability of the narrative detail, although the overall goals are clear, the music has to adapt to accompany the gameplay. For example, on their way to a depot, the player may stop to survey the landscape, and the music must change as they have come to a stop, or the player may fall into a lake, die and re-spawn. The music must provide an accompaniment for each action. This is not an issue if the musicians knew what was going to happen and the exact time, but as it is, they have to adapt to the incidents as they unfold unpredictably. In Terra Nova this was approached by creating musical elements that could be called-up by the conductor of the ensemble immediately, 'on the fly' (see figure 4)
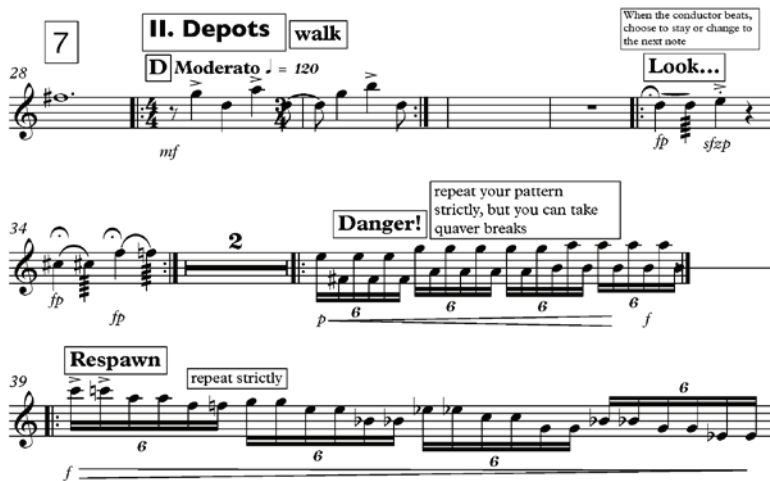
The challenge in *Terra Nova* is that unlike computers, which can react to the game-play in the smallest fractions of a second, the ensemble has to wait to be cued-in by the conductor. However, as the conductor is watching the game-play, they can reasonably anticipate the actions and react accordingly. They can also express the mood in a richer way than an algorithm can. In recent performances, cues like those from *fig. 3* were used as a Soundpainting *palette*. This is a set of possible gestures to be cued-in as well (Thompson, 2014) but the palette in

one instrumental range can co-exist with live-composed parts in other ranges that the conductor/Soundpainter creates while adapting to the gameplay.

The use of Soundpainting and a basic cue set helps create and fulfil or frustrate the viewer's expectations. If the ensemble was a free-improvisation one, this would be much more difficult as the ever changing musical states of the players would be truly unpredictable for the audience. Free Improviser and author Wade Matthews (2012 : 61) in his recent book *Improvising: free musical creation*[16] argues that although a lone improviser may be guided by their tastes and memories, individual gesture is redefined and contextualised by the collective dynamics of intention in ensemble improvisation. If we agree with Matthews assertion, a free-improvising approach would not be ideal to accompany video gameplay as the traditional film diegetic and non-diegetic roles of the music (Tagg, 2012: 546) would be impossible to fulfil in any obvious way.

4.EMERGING THEMES

4.1.COMPEL FACTOR AND REWARD

In both *Ho* and *Terra Nova*, what I would like to call the 'compel' factor is rather low. In the case of *Ho*, there is no clear expectation of success/failure and thus no point-scoring. This makes the game more '*paidia*' or child-like free play than '*ludus*' or rule-based play. In the former the audience is invited to enjoy exploration in itself, in the latter the audience can anticipate what may be accomplished and participate in the agonistic tension of the game-play. Ideally, for music to have clear diegetic roles there must be a clear narrative sequence and this invites *ludus*. Yet pure *ludus* may lack the flair and unpredictability of serendipitous discovery promoted by *paidia*. The balance between *ludus* and *paidia* is a delicate one and this is something the artists must ask themselves and try to assess within their work in new musical media. In Terra Nova, the gaming compel factor is low as a result of the ease of the game but the musical compel factor is arguably higher than the game itself. This is because it anticipates, rewards or defeats, according to simple narrative conventions, and thus easily identified by the audience. In *Terra Nova*, as a result of the rehearsal process, the musicians learn how to anticipate the game-play and

16 Original title in Spanish: '*Improvisando: La libre creación musical*'

eventually are not taken by surprise by the actions they must accompany. This results in the whole ensemble (VG player and musicians) having to 'fake' difficult moments in the game to be able to highlight them to the audience. The game becomes dramatised. In *Ho*, the same thing eventually happens, as the player learns to navigate well, they can use their anticipated sonic results to trigger musical reactions from the ensemble.

4.2. SYNC

In *Ho*, the musicians face the screen and can see the game, thus an element of free improvisation is guided by a response to the visuals. In *Terra Nova*, the musicians do not see the game and thus are following the conductor; their extemporary decisions obey a musical logic of the moment more independent from the visuals. Both methods produce good results, the choice depends on how much formal constraints need to be imposed on the players or not. It is important here not to try and apply political concepts of democracy, independence or authority to the ensemble-versus-visuals disposition as this dynamic is primarily for representation or metaphor. Having stated that, we could characterise *Ho* as a more democratic, yet reactive piece[17] while Terra Nova is more hierarchical.[18]

4.3. LIVE CINEMA

Live video game playing accompanied by music is a form of live cinema. The latter is being practiced since the early 2000s and the VJ like practice of artists like Peter Greenaway, *Eclectic Method*, *Light Surgeons* or *Addictive TV* should be evaluated alongside more 'artistically sanctioned' film work like that of Steve Farrer, Tamara Krikorian and Lis Rhodes. In the case of live video gaming, we potentially have artefacts that are much closer to traditional film itself in the sense of figurative visuals, narratives and plots. An interesting avenue for future work is how to blend the stylistic contributions of both to create interesting and surprising cinematic experiences with a high compel factor that truly unfold before the audience and do not have set endings.

17 The players are cued in by sounds from the game-play.

18 The players follow the Soundpainter or conductor, and have notated music as well.

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