

M-Level Project

Student: Josh Fairhead (21057665)
Project Supervisor: Andrew Bourbon

Pathway: MA Audio Technology
Module Title: MA Project
Module Code: MU70013E

| | |
|---|-----------|
| Contents and Media | 4 |
| Abstract | 4 |
| Introduction | 4 |
| Research and Development | 6 |
| <i>Lyrics</i> | <i>6</i> |
| <i>Arrangement</i> | <i>6</i> |
| <i>Pre production</i> | <i>7</i> |
| <i>Recording</i> | <i>7</i> |
| <i>Editing</i> | <i>8</i> |
| <i>Mixing</i> | <i>8</i> |
| Background Commentary, Structure and Content | 9 |
| <i>Primates</i> | <i>9</i> |
| <i>Grey Sky</i> | <i>9</i> |
| <i>Harmonic Splinters</i> | <i>9</i> |
| <i>Robots</i> | <i>10</i> |
| Technical considerations | 10 |
| <i>Drum Recording</i> | <i>10</i> |
| <i>Bass Recording</i> | <i>11</i> |
| <i>Acoustic Guitar Recording</i> | <i>11</i> |
| <i>Primates</i> | <i>11</i> |
| <i>Grey Sky</i> | <i>11</i> |
| <i>Harmonic Splinters</i> | <i>11</i> |
| <i>Robots</i> | <i>12</i> |
| <i>Electric Guitar Recording</i> | <i>12</i> |
| <i>Charango recording</i> | <i>12</i> |
| <i>Vocal and Mandolin Recording</i> | <i>12</i> |
| <i>Further Considerations</i> | <i>12</i> |

Critical Analysis

13

References

15

Contents and Media

1.1 Redbook CD of a four track EP

1.2 DVD containing a playback session for the surround masters and non-redbook mixes

Abstract

This project consists of a four track EP containing original material recorded and mixed in both a surround and stereo format. It is aimed as a portfolio show case piece to demonstrate the following:

- Song/lyric writing ability
- Arrangement ability
- Performance ability
- Personal production values and creative skills
- Proficiency as a recording/mix engineer in multiple formats
- Planning, networking & co-ordination ability

On a personal and professional level the projects intention is to create an auditory artefact which may be used for personal reference within multiple areas of the music industry while also creating media that could earn a possible income.

The recordings are intended to be of a high enough standard to secure potential licensing and publishing opportunities of which the film industry is possibly the most lucrative. As such the songs were tracked natively in a surround format for their potential use in film.

This project sincerely aims to display a balance between technical and artistic ability - arguably the producers niche - while getting practiced in key tasks a producer assumes responsibility for on a regular basis; such as people management, organisation and co-ordination.

In terms of sound craft the project discusses the various major aspects and considerations in striving towards the authors perception of a subjectively desirable sound, performance and feel; ultimately delivered as the final product [discs 1.1 & 1.2].

Work flows, methodology and outcomes are also discussed detailing the various various discoveries and failures encountered during the projects undertaking.

Introduction

Initially the project was conceived with a peer as a concept project detailing the evolution of music. However this theme became tiresome and was amalgamated by the author into a larger theme drawing reference between the growth of musical relationships (e.g. melody/harmony) and our everyday relationships (e.g. inner thought/outer communication).

Previous recordings of the tracks Robots and Primates were recorded for another module because they did not live up to the desired standard. They have instead been re-recorded from scratch with different arrangement for the purpose of this project. Although dismissed as failed first attempts they provided an early insight into the potential pitfalls of a faulty

workflow and influenced the production methods discussed and utilised throughout the project.

A major production aim was to create flow between musical sections while the instrumentation sits together “on time” and with a desirable “groove”. Initially it was thought that tempo mapping a good performance and creating a custom click track from its slightly averaged tempo data, could provide a means to track the instruments together tightly but with the advantage of having an organic feel. This reasoning however was faulty and was amongst one of the causes in the previous versions failure; the click was an unstable point of reference and the music following it failed to feel consistent.

In order to remedy this the author opted for a compromised approach; certain tempo curves were deemed necessary while the musical majority would remain at a steady pace. In order to obtain the desired feel the author resorted to editing the micro timings of most notes played by the recorded instruments. This was immensely time consuming although new workflows were identified and good results were achieved.

The songs themselves were structured and created through a reflective process; firstly musical sections were written, over which lyrics were drafted before the sections were then jammed with a drummer to further develop ideas and test various transitional possibilities. After this, the lyrics were then redrafted over a finalised chord sequence to ensure they ran appropriately.

A click track and tempo map was created prior to tracking each song and a guide guitar was also recorded. Given the multitude of time signature changes which had to be figured out and then written into the tempo ruler, the mapping process was quite time consuming although it proved to be time well spent. Doing so forced structural decisions to be finalised, transitions to be scrutinised and also provided an opportunity to set memory locations across the whole session; saving time throughout the rest of the project.

The various instruments were recoded as overdubs and multiple recording setups were used in pursuit of a desired timbre. During this process the author researched and utilised a variety of stereo and surround arrays in order to later make maximum use of the extra space provided by a surround environment.

After the instruments were recorded, an scrupulous amount of editing took place to sit them all into a locked groove. Due to the odd time signatures and the changing feel of the playlists, beat detective functioned slowly and achieved results less desirable than manually slicing the transients and aligning the clips to offsets from the grid by eye/ear. To speed this process up the author made extensive use of a keyboard based workflow found through independent research.

Given the mass of editing that took place, the master playlists were consolidated “raw” into new sessions in order to reduce the overall performance load before for mix took place. A master backup was also kept containing every playlist recorded incase a need to use them later arose.

Finally the mixing was done in four stages; routing, phase aligning, overall balancing/tonal shaping and automation. Firstly channels were assigned to natively decode the recorded source, regions necessitating phase alignment were nudged into place after which typical mix techniques and problem solving methods were employed in processing the sonics. Advanced automation workflows were then utilised in Pro Tools to finalise the mix balance.

Research and Development

To complete these tracks there were many forms of research pursued in multiple disciplines. This was entirely necessitated in playing the role of producer throughout the project and required the author to take responsibility as lyricist, arranger, performer, recording/mix engineer.

In researching for such the author looked to favorite productions for guidance in a variety of creative endeavors and as a confirmation of personal preference. The works that played largest influence in terms of both artistic merit and production style were those by King Crimson, Brian Wilson's SMiLE and The Band. Other works were of course influential in niche aspects and will be mentioned with where appropriate.

Lyrics

From the above influences, it's certainly safe to say of that a good deal of the mentioned artists catalogue contains either cryptic or symbolical lyrics; they are abstract in nature.

Peter Sinfiels lyrics on the first four King Crimson albums largely describe a story of King Frederick II, who was in turn used as a metaphor embodying the alchemical union of opposites (Green 2001). However throughout the four albums the protagonists identity is never exposed and the listener who without prior research, is ultimately left unaware of the writers actual intention. Instead the listener is seemingly allowed opportunity to project their own meaning into the lyrics, while the words themselves serve as an emotional guide.

"Strongmen lost their hair, paybox collapsed and Lions sharpened their teeth. Gloves raced round the ring, stallions stampeded" - Peter Sinfield (King Crimson 1970)

Similar could be said about the abstract lyrics used throughout Brian Wilson's SMiLE. In regards to these Leonard Bernstein (1967) states "There is a new song, too complex to get all of first time around". In the authors opinion this complexity refers to space between all the original lyrical intentions - including misdirection - and the multiple possible threads left open to a listeners interpretation.

While learning to understand Sinfiels lyrics - predominantly through his analysis portal - the author also took an interest in the related symbology which would also provide a platform to write the song lyrics through. In many respects - according to the authors understanding - symbology is a guide to the metaphorical underpinnings of parables or stories; each object or action has a specific meaning which is then contextually framed by situation. Certainly it could be argued that this is the framework or "moral" of a story on which the grounds can be later laid for a song.

While researching various aspects of symbology such as dreams and myths, the lines eventually blurred into analytical psychology and other concepts such as "the shadow", originally presented by Carl Jung (Akroyd 2012). This knowledge became a structure for detailing and relating subject matter within a consistent format, while adaptations could easily be made for artistic purpose.

Arrangement

Initially the arrangement was thought to be primary research only, in that it was a trial and error process. However Jourdain (p98, 2002) states that musical tastes are "buttressed" from previous exposure and generally hints throughout his book that our evolving tastes

are shaped from precursory listening. To this degree the author has on retrospection found evidence of this within his arrangements; for instance the author noticed the intro chord ornamentation to Harmonic Splinters may have come from the final chords of Indoor Games (King Crimson 1970).

In terms of pre production and writing the sections, an initial verse progression with draft lyrics would firstly be auditioned against other potential passages. These were then brought to a drummer and practiced in order to get a sense of the best possible transitions, over this the main body of lyrics were then drafted with such retrospective knowledge. Further testing of structural content, such as breaks and the sustained counts, continued until the base arrangements were complete. Further reflection was given to each of the arrangements before overdubbing each instrument in order to capitalise on unintentional opportunities. Examples of such moments can be heard on the fill at the end of the Primates which the bassist was asked to double, or the cymbal choke everyone stops on which occurs in the guitar solo.

Pre production

In setting the tempo, research was carried out into Pro Tools tempo mapping functionality. It is not as simple as it seems in that there are various repercussions to the different states of the tempo ruler. According to the Pro Tools reference guide (p790, AVID 2012) there are two states that can be displayed which are intrinsically linked; bar/beat markers and tempo markers. It makes sense that Pro Tools converts between them if one thinks of them in terms of working in either samples (bar/beat markers) or ticks (tempo markers).

Once the functionality of each state was realised, it became much easier to program the click track into the tempo ruler. The songs were first mapped out structurally by placing the bar/beat markers on the correct counts at an arbitrary tempo before a few takes of the songs were tracked live to obtain baseline tempos. From this information was then extracted and used as a guideline in programming the tempo curves.

Recording

Before recording the author investigated surround recording and mixing techniques in order to decide on suitable arrays. In particular the ORF listening tests (Camerer 2001) provided a great deal of information regarding techniques and placement, while the DVD was previously assessed in another module.

From these an OCT/NHK combo was personally judged to sound the most preferable in terms of striking a balance between spatial envelopment, clarity, imaging and frequency response. This technique is made up of two arrays; an Optimised Cardioid Triangle (OCT) placed at the critical distance which captures LCR and a Hamasaki Square (NHK) placed back into the diffuse field and are used to fill out the rear surround (Ibid).

The OCT comprises of a centre cardioid microphone placed at the critical distance with two pairs of flankers (hyper-cardioids and omnidirectional) placed 8cm behind and with a variable base width. This technique relies upon the base distances to determine the recording angle with recommended distances being between 40-90cm to give angles between 160° and 90° (DPA 2012). The centre cardioid pickups a half left/right image which then sums with the 90° off-axis hyper-cardioids, the amount of which varies dependent on the base distance (Theile 2001, p17). The hyper-cardioids are used to capture the spatial information but their low end responses are often deemed unsatisfactory; to compensate a HPF is placed at 100hz and the signal is summed with the

omni-directional mics which then have a LPF placed 100hz to correct the arrays response (Ibid).

As mentioned the NHK is used to fill out the rear channels of a surround environment. The array is composed of four figure of eight microphones placed into the diffuse field, equal distance from each other and pointing 90° off axis from the source. The aim of doing such is to ensure minimum echo/delay problems with relation to the frontal pickup.

Similar research took place regarding stereo techniques and in particular Lipshitz (1985) discussed coincident vs. spaced microphone pairs. He argues that due to the way audio is reproduced over loudspeakers, spaced pairs will inherently add phasing as they rely on inter-channel timing differences which do not correctly correspond to our Head Related Transfer Functions (HRTFs). However he states that coincident pairs, which rely pure on level differences, will be accurately reproduced and heard. This is in the authors opinion is a strong case to use coincident techniques for accuracy purposes. However, Lipshitz comes from a purist background, and as stated within his paper he does not believe that phasing artifacts can contribute in a positive way to the aesthetic of a technique, which in the authors opinion and experience is untrue.

Editing

As the instruments were mostly recorded in a compilation from playlist fashion, the different takes micro timing would vary dependent on the performance. This left the options of comping less desirable takes into the master playlists for timing purposes or using more out of time takes for the sake of their performance. Ultimately the decision was made to compile better takes and then edit the micro timings of the notes to achieve both goals.

This required an immense amount of editing and so the author investigated editing workflows within Pro Tools. Beat detective was the first option looked into however given the amount of reprogramming needed, due to the odd time signature, the results were poor and instead a keyboard focused workflow used to manually arrange the audio clips. The most detailed and digestible methods detailed by Brent Heber (2011) on his website Pro Tools Professional which met the authors needs entirely.

Mixing

Importantly when mixing in the surround format is decoding and correctly assigning the channels of an array. Following the advice of the ORF paper the author spread the OCT between C, L & R and inserted a low/high pass filter on the respective omni/hypercardoid channels. The NHK was spread out over the rear channels; the front most figure of eights placed halfway between front and rear speakers and the furthest microphones placed completely into the surrounds (Theile 2001).

Academy guidelines (Ainley 2004)¹ into mixing in the surround format were also investigated further. In particular they point out that most consumer systems do not have a full range centre speaker and as such one should always check the mixes on a satellite designed consumer system. This was however not within the authors available resources and so a minimum of information was sent to the centre speaker where possible.

Background Commentary, Structure and Content

The below commentaries are intended to clarify the metaphorical meaning behind each track. Technically speaking they aim to provide a context to the critical decisions that were made throughout the project period.

Primates

The lyrics on this track could be said to set precedence; it outlines a story of musical evolution to which the other tracks later reference. It runs in sections of three; the verses detail the birth of melody/rhythm come from, the bridges refer to an interdependent musical hierarchy, while the choruses portray humans celebrating the existence of both.

Throughout the track the lyrics parallel this musical growth to that of a tree, before they point to a “super-monkey” swinging in the branches; a metaphor referring to the skill of someone who balances musical elements and/or personal thought effectively.

The key expression behind the track is ultimately a primitive feeling of momentum gathering to reach a stable velocity, before cycling over again.

Grey Sky

Established in Primates is that the tree from which the “super-monkey” swings is composed of musical elements, while also referring to personal balance. Grey Sky now explores this metaphor further in referencing and further detailing the previous themes of personal and musical evolution.

The listener is then informed of milestone errors and outcomes surrounding the growth of an individual and its explained that with the right attitude, bad experiences can be better than they initially seem.

The underlying mood of the track is intended to convey a sense of regret while maintaining a sense of positivity regarding future events. It also serves as a prequel to Harmonic Splinters.

Harmonic Splinters

This track provides the authors thoughts on a social existence and parallels it with imagery of musicians learning to groove with each other; from clumsy first attempts in the third person to a reflective internal state.

The section dealing said first steps is intended to depict an enthusiastic, good natured yet slightly aggressive state. The first verse details actions one might wish to take, while its corresponding chorus points out that ones potential that cannot be fulfilled in such a way. The following verse then describes a process of finding balance while its chorus points to a path of self reflection and rationalisation.

The listener is then ushered into a more intimate section which conveys an experience encapsulating the themes of breaking emotionally, denial, reflection and acceptance. The section repeats and depicts a renewed outlook to close the events of Grey Sky in a more personal manner.

The musical flow also dictates movement between from an extroverted state to a more introverted and personal one, after which we end on a chorus passage to summarise the outcome.

Robots

From the initial scene of Primates and its subsequent tracks we reach an inverse in Robots. The first half of this track describes an alternative reality from these pieces, using apocalyptic imagery of the music industry to discuss the subject of auto-conformity in a broad sense.

The well known product Auto-tune is used as a means to illustrate anything that one may have become subconsciously accustomed to doing, saying, thinking or feeling which comes at the expense of expression. The last verses then point toward the thought that we should accept imperfection in matters that are outside of our control.

A fantasy war is intended to portray a battle of personas and is used to symbolise the thought that of the infinite possible scenarios available to us, positive or negative, a given outcome is dependent on ones present state of mind.

Lastly the outro section exists to sum up the EP with an upbeat ending and to also iterate the above point on conscious state in a less ambiguous fashion. This final section is left only partially resolved - both lyrically and musically - to convey a final sense of uncertainty.

Technical considerations

In organising this project, a large amount of time went into preparation and planning. From the beginning this involved finding the most effective way of obtaining musicians, while simultaneously structuring the material before recording sessions could begin. More detail can be found in the session diary.

After this a good degree of schedule changes and compromises were also made in order to fit together the schedules of both the musicians and the author, the details of which can be found in the session diary. Furthermore, in order to maximise recording time the setups were often reused or modified to record appropriate sections.

Drum Recording

Given they would be the loudest instrument recorded it made sense that they should make use of a native surround array. Although a variety of techniques were investigated the OCT/NHK combo was ultimately chosen for its imaging stability, spatial envelopment and frequency response. There were two separate tracking sessions to record the four drum tracks and in pursuit of a decent sound, a personal drum kit was supplied with fresh heads on it. Preparation wise this was set up the evening before the session with mic stands and cabling also ran.

Dividing the sessions a heavier bronze snare drum was used on Primates/Robots for a more primal/apocalyptic feel and a lighter wooden snare was used on Grey Sky/Harmonic Splinters for a faster paced and more nimble feeling kit. The close mic selection was chosen for a retro rock sound and was used in both sessions to retain a sense of constancy despite the different snare drums.

During the second drums session it was discovered that the wall box tied to VH2 was limited to 18 tracks. To work around this, extra long cabling was ran into the booth which could then be cross patched into appropriate preamps. Unfortunately so much patching led to disaster when the rock tom was unfortunately dropped, due what's now suspected to be a faulty patch chord. Luckily however these were picked up significantly enough in the over heads and ambient arrays to manage without.

Bass Recording

The bass sound wanted for the tracks was one with quite a resonant low end. Initially this was sought at the amp but turning up it was not shaping the envelope of the low frequencies in the desired way. Further causing problems was a lack of shared availability between the author and Paul the musician and eventually after a failed session where he had to leave early, we decided to record direct instead in order to gain scheduling flexibility. It was initially the authors intention to then re-amp this signal but an alternative solution was found while mixing instead.

Acoustic Guitar Recording

This is where the setups varied most so its worth discussing the aims of each track instead.

Primates

The sound sought for this track was that of quite a large acoustic with a sense of ambience around it. In pursuit of achieving this a Jumbo Taylor was recorded using a co-incident pair of DPA 4011's placed three and a half feet from the body given due to the level it projected at. This was then paired with the Hebden Sound CM1050 on the neck to capture a detailed high frequency and an AKG C414 placed over the shoulder to capture ambience and a solid mid range.

Grey Sky

This track uses two different acoustic guitars and two different players to juxtapose opposite timbres against each other and to follow the songs imagery. The left guitar was Ivan playing his Takamine and the right was the author playing his previously mentioned jumbo Taylor. The Takamine aimed to capture a softer sound and had an NOS array placed about three feet away from the body with a Royer clone placed over the shoulder capturing ambience, and a Hebden Sound CM1050 placed at the 12th fret for HF detail.

Because the Taylor was intended to balance with Ivans acoustic it was recorded in the same way but with the addition of an Equitek CAD on the soundboard simply placed for experimental purposes.

Harmonic Splinters

As the tracks first section called for an energetic entry, the Taylor was double tracked with a coincident pair of DPA 4011's placed at a distance of two foot from the guitar to gain an aggressive sound. A Neumann TLM 103 was placed over the shoulder to capture a solid low midrange Calric CM1050 captured the high frequency detail from its position around the 12th fret.

The same acoustic setup from tracking Ivan session was used on the middle section with the Taylor doubling some of his pattern. Again Ivans acoustic sounded much more intimate than Taylor could which is why it worked in such a section. Ivans Takamine is also audible

as a third central guitar on the verse/chorus sections of the surround mix, albeit at a greatly reduced volume.

Robots

This consisted of arrays used on Primates and Harmonic Splinters and for the most part was aimed to sound quite clean. The war section onwards is single tracked dropping one Taylor setup for the war section and turning into Ivans Takamine at the end, which was called for due to its much softer tone.

Electric Guitar Recording

These were tracked over two sessions, of which both used a coincident pair placed back from the amp to capture a sense of depth to the electric guitars. This was mainly intended as a reverb feed but it worked out preferable to use the at around a 50% mix with the spot mics. The microphones placed on the amp were mismatched from later blending and were an EV RE20/Sonotronics Sigma for one session and a Royer imitation/TLM103 for the other. Taken as a last resort was the DI signal which was actually useful for adding grit to the sound. At the start of the signal chain was Ivans Japanese Tele from the 80's which ran into his effects before they sent to an EQ pedal which sent to his amp. Instead of moving the setup around we found it quickest to just set the controls before the amp to find a desirable sound.

Charango recording

As an additional instrument, this was recorded at home in mid-side using the Oktava MK-012 kit. When performing Miguel was asked to play standing either side of the array to somewhat naturally balance the panning of the double tracking.

Vocal and Mandolin Recording

As a final resort the author recorded vocals at home out of necessity, not being a vocalist a long time was spent recording the parts and to effectively get through it all it was quickest a self operational manner. Given that the authors room is completely untreated, a DIY reflection shield was cobbled out of bedding hung just behind the mic which was a transformer-less Audio Technica AT4030. This same setup was then used for the mandolin as well which was borrowed from a friend, unfortunately after restringing it the intonation was not quite accurate. To fix such a problem, the mandolin was simply tuned to the only chord played on it - A Maj - bypassing the need for accurate intonation entirely!

Further Considerations

Aside from recording and production considerations careful thought was given to channel placement within a mix. Obviously surround channels were assigned for correct decoding but many stereo tracks were also placed out into the surround field stretching them beyond their traditional confines, examples of which can be heard in the placement of the Charango between the front and rear speakers. As mentioned the centre speaker was used sparingly due to consumer systems most likely having a bandwidth limitation, however it was still useful for reinforcing important phantom images such as the vocal or the snare drum.

The decision to use hardware compression on certain tracks was also important. Due to the amount of gain reduction required on the vocals it made sense to use the Amek over a plug-in as it sounded much more transparent. It was also used on the main stereo array of Ivans acoustic guitar at the end of Robots because its dynamic sound was quite pleasant but required some compression to sit with the drums/vocals.

Regarding the mix, the author found several tricks to be quite useful in solving masking issues and related problems. For a start the snare drum would tend to get lost in the ambience so after compressing and equalising it the author ran the top mic through a Sans Amp plugin to generate some harmonic distortion. this enabled the channel to cut through the mix and assert itself without pushing the level too high.

Another problem frequently met was the bass guitars lack of solid sub frequency. As mentioned this was due to the envelope of its low end fading out too quickly and to remedy this an exciter was used to compress the low frequency content and add some harmonic distortion which would often come from the signal passing through an amplifier. Doing so while sending a small amount of signal to the LFE consistently gave a solid low end, while also leaving the notes played as quite audible.

Down mixing the tracks into stereo was also required once the surround mixes were complete. For a large part it was a case of re-assigning busses and resetting automation levels but the loss of the central channel and LFE also required some further frequency redistribution as well.

Critical Analysis

To a large extent this project has been successful although there are undoubtedly a few regrets. For a start its unfortunate that personal time was in such short supply, which in turn had a knock on effect to the recordings and the completion of additional material. In the time between September and October two other tracks were written but the recordings could not be completed due to time constraints and booking availability. Although the drums for one track were completed they have been left out of the project.

Not finding the correct singer was also a disappointment as the author feels his efforts were not of a high enough standard. Attempts were made in finding one along with discussions with a backing singer. Unfortunately the parties contacted became otherwise engaged; Jury Sweethard a potential candidate for lead vocals fell into financial difficulty before contact was lost, and Wei Foos flight through London was rescheduled leaving no time to record the backing vocals we intended to record.

As the vocals were not of great quality the author resorted to heavy compression after which the central channel was duplicated twice to be sent to the left and right speakers to create a faux double track effect. This allowed a more solid image while retaining a good degree of fold down on satellite systems. It was also intended to record some honkey tonk piano to play over the end of Robots but once again time couldn't be found.

The author is however mostly pleased with the tracks that were completed. The editing on Robots/Primates is a little rough at times, although the average listener probably will not notice. On Grey Sky and Harmonic Splinters this editing work is practically unnoticeable and to the author ears it sounds great. The reasons it may not have been so successful on Robots/Primates could be down to two factors: the tempos in both tracks are slower and so larger gaps between edit points become more apparent, or that the louder snare drum excited the room to a greater extent generating more reflections with a longer decay time which made the crossfades easier to identify.

The feel of the productions are mostly consistent in regards flow thanks largely to the amount of pre-production that went into structuring the tracks. The sections where refrains were used, generally feel pleasantly unpredictable and if one looks into the counts they can often find micro structures that keep things interesting. For instance Harmonic Splinters uses pauses of 6 then 7 counts to hold on while the end of Robots adds additional beats each repeat.

In terms of sonics, the author feels that the backline used on the project achieved the highest possible quality at the source and could not have been better without a deal of financial investment. Backline aside however the author feels that although the recording quality is of a decent standard, in retrospect it would have been preferable to move some stereo arrays slightly closer to the source in order to add a touch more presence to the guitars, both electric and acoustic. This bares particular relevance to Robots on which the guitars do not sound aggressive enough to properly convey the apocalyptic imagery, while the electric guitars are also lacking in solid low end information.

The other guitar tracks are somewhat more acceptable; Harmonic Splinters conveys the correct sense playful hostility, Grey Sky contains juxtaposed guitars which balance nicely and Primates has a deal of constrained energy in its sound although the main array was again, slightly too distant sounding. Despite these blemishes the stereo imaging came out quite stable after a bit of compression and equalisation mostly due to the tightly locked editing.

All the setups worked to different degrees and in particular the sound of Ivans Takamine and feel of his playing were incredibly suited to the sections dubbed. The middle section of Harmonic Splinters sounds intimate and warm as it should, while the final part on Robots sounds like a high fidelity retro guitar with which the author couldn't be more pleased. In specific it sounds like something Robbie Robinson might have played on Northern Lights (The Band 1975) which was exactly the sound sought.

The drums also sound appropriate for the style of music played which was big and ambient. The sound intended for Primates and Robots was a ambient pumping effect similar to that found on "When the Levee Breaks" (Led Zeppelin 1971). The Drums on Harmonic Splinters and Grey Sky were intended to sound similar, but somewhat more nimble and to this extent the authors goals were achieved by recording in Vestry Hall.

As mentioned the electrics could have used more low frequency content; however this was not entirely detrimental to the guitar solos which are intended to sound akin to those by Jake E Lee (Ozzy Osbourne 1983). In recording them a variety of effects were used to liven up the sound of the guitar the effects chain generally being guitar> overdrive> phaser> wah> amp, before reverb and a multi-tap delay were added in mix. Upon editing the author realised that distorted solos have very few distinct transients and that the DI tap taken should have been pre-effects; this would allow for tighter editing before re-amplifying performance later through. Regardless the solos compiled well and there were only a few issues.

In positioning the instrumentation around the surround environment the author also feels successful; automation was used appropriately to move instruments to the unobtrusive areas creating space for instruments that demand the listeners attention. All source channels were internally bussed within Pro Tools for the convenience of grouped sends while bus compression was used then to glue many of the groups together (e.g drums).

Automation was used throughout the mix to then keep channel levels consistent, while also pushing the musics feel up or down. In respect to this the work flows on Brent Hebers (2011) website were followed as guidelines to speeding up this tedious workflow; using the back and play function on the C24 allowed a great deal of automation to be written in a single pass, redoing any missed cues as the track progressed. Automation was also applied between sections where plug-in settings needed modification. Although the back and play function was used for this snapshot automation may have proved quicker.

As stated within the introduction to this project the intention was to create an audible artefact which can serve as a personal promotional tool within the music industry. Although not perfect the author believes that this project demonstrates a strong ability in songwriting, arrangement, performance, production, recording and mixing and meets this goal.

Also stated was the intent to create media that may eventually return an income provided licensing is secured. To this degree the surround mixes are of high enough quality to be used commercially and so they to meet this goal. While the stereo mixes are certainly of a high enough standard, further work on them may still continue as the project continues to evolve after the hand-in.

Word count: 5769

References

Ainlay et. al (2004) - Recommendations for Surround Sound Production - The Recording Academy's Producers & Engineers Wing, [online: http://www2.grammy.com/PDFs/Recording_Academy/Producers_And_Engineers/5_1_Rec.pdf]

AVID (2012) - Pro Tools Reference Guide p790 - [online: http://avid.force.com/pkb/articles/en_US/User_Guide/en379111]

Akroyd, E. (2012) - The Shadow - [online: <http://mythsdreamssymbols.com/shadow.html>]

Bernstein, L. (1967) - Inside Pop @48:58 - [online: <http://www.youtube.com/watch?v=afU76JJcquI>]

Camerer, F. (2001) - The ORF Listening Tests - Hauptmikrofon, [online: http://www.hauptmikrofon.de/index.php?option=com_content&view=article&id=68:orf-surround-techniques-comparison&catid=29:stereo&Itemid=58]

DPA (2012) - Optimized Cardioid Triangle - [online: <http://www.dpamicrophones.com/en/Mic-University/Surround-Techniques/OCT.aspx>]

Green, J. (2001) - In the Court of the Crimson King - [online: <http://www.songsoupounea.com/Promenade/Court.html>]

Heber, B. (2011) - General PT Tutorials - Australia [online: <http://www.protoolsprofessional.com/general-pt-tutorials/>]

Heber, B. (2011) - PT HD Tutorials - Australia [online: <http://www.protoolsprofessional.com/pt-hd-tutorials/>]

Jourdain, R. (1997) - Music the Brain and Ecstasy – 1st Edition p98, 68 & 69 Harper Collins, US.

King Crimson (1970) - Album: Lizard, Track: Cirkus - Island records; UK.

King Crimson (1970) - Album: Lizard, Track: Indoor games - Island records; UK.

Led Zeppelin (1971) - Album: Zeppelin IV, Track: When the Levee Breaks - Atlantic records, UK.

Lipshitz, S. (1985) - Stereo Microphone Techniques; Are the Purists Wrong? - Audio Engineering Society, Paper 2261, US.

Ozzy Osbourne (1983) - Album: Bark at the Moon, Track: Bark at the Moon - Epic Records; US.

The Band (1975) - Album: Northern Lights, Track: Arcadian Driftwood - Capitol records; US.

Theile, G. (2001) - Multichannel Natural Music Recording Based on Psychoacoustic Principles - Hauptmikrofon, [online: [http:// www.hauptmikrofon.de/theile/Multich_Recording_30.Oct.2001_.PDF](http://www.hauptmikrofon.de/theile/Multich_Recording_30.Oct.2001_.PDF)]

Session Diary

This session diary provides an outline of the relevant events that occurred over the course of this project. Accurate session dates have been provided, however the details of tasks such as editing and writing are more approximate as they were undertaken whenever possible while balancing daily life.

On the 19th of June the author with M-Level Project supervisor and discussed the writing and recording of several surround tracks to be delivered in both stereo and surround formats. This would be carried out by 'drafting' in the musicians and equipment necessary to complete the recordings to a high standard.

The writing process began by auditioning chord sequences and allowing tension notes to denote changes in time signatures as well as the following chords. With the chordal body of the work written, rehearsals were undertaken with the drummer (Darren Jennings) to audition various musical pause lengths and to focus on transitions where momentum could potentially be lost. The lyrics and larger song structures were then composed by referring back to these rehearsals, which undoubtedly proved to be a fundamental part of the projects pre-production.

Adverts were placed on various musician networking websites and a musicians wanted poster was created and posted in London based music shops on June 26th. Given that a musician might not have great back-line equipment fall back plans were investigated and a personally owned electric guitar (Strat) was also then brought in to the repair shop for a professional setup.

Around the start of July bassist Paul Housden was found on a networking site called Bandmix and was contacted. An agreement was then made whereby he would play for recording time with his own project. This time was booked on July 4th and his personal recording session was recorded in EFS1 on July 9th (8 covers with his wedding band - drums, bass, keys, guide vocals).

Between July 1st and July 9th the final structuring/lyric writing was completed on tracks titled 'Harmonic Splinters' and 'Grey Sky', while two potential guitarists were also auditioned and from which Ivan Melo was selected to proceed with overdubbing.

Between July 10th and 22nd studio time and microphones were booked for drum tracking and access to Vestry 1 in the evening before the session was sought in order to gain maximum recording time. Over this period the songs were also charted out, a click then programmed into Pro Tools before a guide guitar was recorded for the drummers convenience. New drum heads were put on a personal kit around July 16th and broken in before bringing the kit up to Vestry a day early on the 23rd. This was set up with mic stands and cables in place for the next days recording on the 24th when the drums for Grey Sky and Harmonic Splinters were recorded.

The surround array used for the kit was a Hamasaki Square (NHK) and Optimised Cardioid Triangle (OCT). The NHK consisted of four AKG C414s in figure of 8 pickup pattern and the OCT consisted of two hyper-cardioid C414s with two [filtered] DPA 4090 omni directional microphones at the side of the array and another C414 with a cardioid response placed in the centre. The NHK was placed at the back of the hall in the diffuse

field and the OCT was placed with the front cardioid bordering the critical distance with flankers positioned 8cm behind it and 40cm either side of centre.

The close mic setup on this session was a pair of Beyerdynamic M160 ribbon microphones as hypercardioid overheads in space omni configuration placed equal distance from the beater. A Beyerdynamic M201 was used on the beater with an EV RE20 inside the drum. The snare top mic was a Beyerdynamic M99 with a *DPA 4011* placed on the side angled to capture a bit of kick drum also. The tom mics were clip on Sennheiser *e504s* and the hi-hat mic was an AKG SE300B aimed from above the centre pointing to the left most lip of the cymbals.

These drums were recorded in a play list based workflow capturing as many 'good' takes as possible for each section. The playlists were then compiled together (comped) between the night of the 24th and the 27th of July to form a full take. Lacking experience and a developed workflow and oversight was made here as the drums were incorrectly comped to the guide guitar causing setbacks which will be discussed later.

On the 28th and 29th of July preparation on the songs Robots and Primates took place. They were charted before a click was programmed into Pro Tools after which a guide guitar was subsequently recorded. These songs had already been written and previously recorded with poor results; tackling them again required a deal of restructuring and pre-production that also took place on these dates. In the evening of the 29th the drum kit and mic stands were once again set up in the hall to maximize the time tracking in the next mornings session occurring on the 30th.

The surround array and close mic setup was the same as on the previous recording with minor alterations in mic positioning. The sound however is notably different due to an excellent quality snare drum which was a bronze Black Panther, borrowed for the purpose of the session.

The newly recorded drums went through a stage of comping after the session on July 30th until August 5th. Once again this was compiled to the guide guitars and caused unnecessary problems later on down the line.

On August 6th bass guitar was tracked with Paul Housden on Grey Sky and Harmonic Splinters in Basement 1. For convenience he was positioned in the control room and connected to an amp in the [small] live room through the studio tie lines. Several mics were placed on the amplifier for audition purposes all positioned on axis and consisted of a Sennheiser MD421, an EV RE20, a DPA 4090 and a Beyerdynamic M201.

Unfortunately it now came to light that comping the drums to the guide guitar was an oversight, proving to be quite an effort to track over and even then they sounded a bit out of time. Regardless acoustic guitar tracking was scheduled for the next day - August 7th - with Ivan Melo and before the drums and bass could be edited on these tracks and so the guitars during this session were recorded with heavy reliance on the click. The tracks covered that day were on Harmonic Splinters, Grey Sky and the end of Robots.

A personally owned Taylor 315CE Jumbo acoustic was freshly strung and brought to the tracking session, instead Ivans Takamine was used in its place for its preferable sonic quality. This was recorded with modified Chinese Royer 121 imitation mic placed over the right shoulder with a figure of eight response, an ORTF pair of AKG C414s and 3ft in front of the guitar and a Hebdon Sound CM1050 placed around the 12th fret.

On August 8th a tracking session took place in Basement 2 to record a Didgeredoo intro for Harmonic Splinters with Tony Urwood. Unfortunately some problems were encountered here when the studio Mac failed to boot with an external hard drive attached and would not copy between drives so a new session was created on the internal drive as a basic work around. The microphone setup was an EV RE20 at the open end of the instrument a Neumann u87 nearer the mouth piece and a double mid-side as a surround array. After auditioning several takes the author scraped the idea as it simply didn't sound appropriate.

From August 9th editing started to take place on the tracks; in particular on the drums, bass and acoustic guitars played on Grey Sky and Harmonic Splinters which were quite out of sync with each other. Revising the original comping method the drums were edited closer to the click in sections consisting of roughly a few beats, proving more successful than the previous attempt. However with the click disengaged it became apparent that further adjustment would again be necessary and was remedied by editing the drums the the grid soloed without a click while listening intently for timing drift.

With the drums settling into place the bass was then edited to match the exact down beats of the kick drum in order to fake a superhumanly perfect 'in the pocket' performance. Following the same trend the guitars were also edited in small note groupings to match the drums and bass timing exactly. Finally the non-downbeats that coincided between instruments were also edited into place. For the tracks Robots and Primates the drums were edited in an identical manner whereby they were edited to the grid with off sets being applied as the result of auditioning the regions.

On the 20th of August an acoustic guitar tracking session took place in Vestry 2 recording myself aided by a peer (Carlos Badosa). The mics were booked out and the studio set-up before he arrived to operate the DAW on request. In this session the acoustics to Primates were double tracked along with a single pass of acoustics on Robots. The mic setup used was an AKG C414 above the shoulder, a Calric CM1050 on the bridge and an XY pair of DPA 4011s positioned about 3.5ft in front of the guitar.

The next day - August 21st - bass tracking was due to take place with Paul in Vestry 2. After setting up the studio he arrived but had to shortly leave again for a job interview after which he intended to return. Naturally this took longer than expected so the session was cancelled and the bass was recorded through a DI at home afterwards. Again editing took place afterwards but this time the bass was synced to the guitar rather than the reverse.

Further acoustic tracking took place in LRC 1 on September 3rd, with a peer operating the recorder on request. This session was to double track Harmonic Splinters and one half of Robots also. The microphones used were DPA 4011s as an XY pair, a Neumann TLM103 raised above the right soundboard and a Calric CM1050 was used on the neck.

On September 4th a session to record electric guitars on Grey Sky and Robots took place with Ivan. This consisted of recording double tracked rhythm guitars and the solo. For this session a Fender Blues Junior was used paired with an 80's Japanese Telecaster. This ran through the studio tie lines into the amp room while Ivan listened back on the monitors. The microphones used were a pair of DPA 4011s about five foot from the amplifier, a modified Chinese Royer 121 clone and a Neuman TLM103.

Final acoustic tracking took place in LRC1 on September 7th, this was to track the last rhythm guitars on Grey Sky and Robots. The setup used was an NOS pair of DPA 4011s

about two and a half feet away from the body, a Calric CM1050 on the neck and Equitek CAD a foot from the sound board and the Royer clone above the shoulder.

Extra electric guitars were dubbed on to Primates with Ivan on September 10th. This involved double tracked rhythm guitars and a solo. The microphones used were an EV RE20, a Sonotronics Sigma and a coincident pair of DPA 4011s. Once again the guitar ran through the tie lines to the booth while Ivan played/monitored in the control room.

October 3rd, bass tracking for Robots took place with Paul. Stems were bounced out of Pro Tools the evening prior to this so we could record DI into Logic (his preferred platform) in his brothers house rather than a studio as time was in short supply for us both.

Charango tracking - a ten string Ukulele style instrument from South America - took place with Miguel DeCampos on October 11th using a flatmates home facilities. This was recorded in mid-side with a pair of Oktava MK-012 microphones of which the design consists of two preamp bodies and a figure of eight adapter and three cardioid capsules. This was only played in the chorus sections and was double tracked like the guitar.

October 17th an overnight drum session took place in EFS1 for a track with the working title Beat Behind. Once again a personal drum kit was brought to the session although the university kick drum and a heavy curtain was used to create an extended body (AKA a tunnel). The kick drum had an EV RE20 inside the main drum pointed at the beater, an Audio Technica AT4030 in the extension and a Beyerdynamic M201 was pointed at the beater from the players perspective. The snare was a pair of Calric CM1050s placed above the membrane and on the shell side. The rack tom microphones were Sennheiser MD421s and an AKG D112 was used on the floor tom. The overhead mics used were a pair of transformer-less Neumann TLM103s positioned three feet above the snare drum and equal distance to the kick drum. The hi-hats were recorded with a Microtech Geffell. Finally a NHK surround array was placed around the drummer who sat in the middle of four figure of eight AKG C414s.

Vocal tracking for Harmonic Splinters and Grey Sky took place in the authors house, using an Audio Technica AT4030, between the dates of October 29th and November 2nd. This required some reworking of the lyrics to fit with the timing of the other instruments but tracking was eventually completed, albeit with difficulty.

On the 3rd of October a Mandolin was tracked playing the highest possible Amaj during the chorus section of Harmonic Splinters. This was borrowed from a friend and freshly strung the night before, as the intonation wasn't perfect the mandolin was tuned to the chord. This was recorded on home equipment using a Focusrite Saffire and an Audio Technica AT4030.

A surround mixing session on Grey Sky took place November 4th in VH2 where channels were assigned to appropriate speakers, phase aligned, bounced into stereo tracks/decoded appropriately and the majority the mix barring automation was completed. Some of this process was also repeated for Harmonic Splinters but several editing mistakes were identified and new drum files had to be exported in evening for replacement before the next session.

On the 5th & 6th the master playlists from the various sessions were consolidated into fresh sessions along with the bouncing of stereo tracks to tidy up the session.

November 7th a mixing session took place on Harmonic Splinters in LRC2. Firstly the faulty files were replaced before many channels were phase aligned and then decoded/assigned to appropriate channels.

On the 11th a session in EFS1 took place to once again repay Paul for his work. This was drums and bass in a mostly disco style. The kick used a Beyerdynamic M88, the overheads were Beyerdynamic M160s, the toms were Sennheiser MD421s, the snare had a Calric CM1050 on the top and a Microtech Geffell on the side along with an AKG C452b on the hats and finally a figure of eight AKG C414 paired with a cardioid Neumann TLM103 as a mid-side room array.

On the 13th through to the 15th of November vocals were tracked. In between mixing took place in VH2 on the 14th, 17th, 18th, 19th and 21st.