The State of Post-Production Film Sound

Report by JOHN KASSAB

2009 Churchill Fellow

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Signed

Date

John Kassab

20 December 2010
Executive Summary:

Contact Details:
Name: John Kassab
Occupation: Sound Designer / Re-recording Mixer
Contact Details: sound@johnkassab.com

Project Title:
The State of Post-Production Film Sound

Project Description:
Upon my arrival to Australia, I decided to extend my research to include sound practitioners in the cities of Melbourne, Sydney, Adelaide and Perth.

Highlights:
The highlight of this project was being able to meet with such a great cross section of visionaries in all corners of the English-speaking world at this particular moment in film sound history.

Major Lessons and Conclusions
The greatest lesson I learned is that the digital domain has created many changes to work flow and collaborative methods in film sound and the global industry seems to be going through something of a metamorphosis. As a result, the focus of many topics in this report concern how the industry is evolving as the result of digital and computer based solutions.
As the project covered a broad range of topics and my conclusions can be found in the discussions below.
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Introduction to Post Production Film Sound:

Has anyone ever tried watching the Normandy Beach scene in *Saving Private Ryan* without sound? I do not mean to take anything away from the genius of Steven Spielberg or the talent of his actors, production designer, editor, cinematographer, costume designer, make up artists, VFX artists, actors, all of the technicians or even the poor army veterans on whose traumatic life experience this scene was based. However, if you watch this sequence without sound, it is almost laughable. The scene falls apart as everything from the shaky camera, to the blood squibs, to the body falls, picture edits, film speed manipulations, and all of the other mechanics of filmmaking, become exposed.

Without sound, the illusion of reality is lost.

Drop the sound back in and your heart rate misses a couple of beats and then speeds up again as your throat dries. With sound, the audience becomes engaged in what is probably the most immersive and violently disturbing scene in Hollywood history. We are completely with the characters in their moment of trauma. An audience with any sense of humanity cannot help but empathise with every physical disfigurement and scream of agony. We are connected to the characters by the common physical experience of sound. As the camera drops to the ground so does our hearing perspective. With surround sound, the chaos of the soundtrack creates a claustrophobic cocoon of violence. This is especially true to those of us who have only ever seen this sequence through the gaps between our fingers.

Alas sound is inescapable. It centres us in the drama, connects us to the characters’ experiences, directs our eyes on the screen and adjusts our emotional focus. Sounds fuel our fears and heightening our anxieties resulting in a physical reaction. It can lure us in with its absence (silence) and throws us back into our seats with its abrupt re-entry. It emphasises the physicality and weight of the characters and expands the locations beyond the dimensions of the screen. Sound can submerge a whole theatre to the ocean floor or send us flying through thin air. With a grand echo, sound can isolate us in the middle of *Nowhere*, or suffocate us from all corners of the theatre into a chaotic third world car-horn-happy city intersection. With incredibly low frequencies (bass), sound pressure can physically rumble the liquid in our body, alerting us to a rising tension or pre-eminent threat or simply beating us in the chest with every footstep, gun shot and punch. With its high frequencies (treble), sound can alert our senses and direct our eyes. With a single well-placed sound, a film can arouse our curiosity, inspire us to reminiscence about the past or even emphasise an important plot point.

Our ears have a direct channel to our memories and emotional banks. Think about the effect that hearing has over our emotional state when we hear a favourite old song on the radio, somebody laughing, a baby crying, an estranged friend’s voice on the phone or a smoke alarm. With an advanced knowledge of the power of sounds, sound teams offer film productions the ability to manipulate their audiences’ emotional responses with every sound wave that is massaged into the final track.

**Film Industry Acknowledgment of Film Sound Practitioners:**

In many world cinema traditions, from New Zealand, France, Australia, Japan, India, South Africa, England to Korea and beyond, Sound Supervisors, Sound Designers and Re-recording Mixers are very often credited along side other creative heads of department such as Cinematographers, Editors and Music Composers for having an integral and leading creative contribution to the final product.
It is unfortunate, and in many ways quite disrespectful, that Hollywood does not acknowledge the integral creative contribution of their sound departments enough to mention sound in the opening title credits. Stranger yet is the fact that sound is the only Academy Award recognized creative discipline that often disappears many feet below the catering staff on Hollywood credits rolls and their names all most never appear on the movie posters. This is perhaps why there are whispers in Hollywood that sound might be dropped from the Arts night of the Oscars and moved to the Sciences ceremony (?!).

This is particularly disgraceful given the pioneering and innovative creative work that many of the world’s sound designers and supervisors are contributing to Hollywood films today. The very few sound-people who have been acknowledged adequately in film title credits, have all had the benefit of a passionate directors and Producers who stand up against various guild objections. It would be ideal if the guilds and associations that represent the interests of Hollywood sound departments can open this dialogue with the studios and other guilds that perpetually block this motion. If a courageous campaign was launched I suspect that many of today’s box-office leading and creatively influential directors will support the cause and have influence over this simple reform.

Sound is seldom mentioned in popular film criticism because of the common ignorance about what it is or indeed what a sound department actually does. Within the film community, the sound department is widely perceived as an ancillary service provider. To the public, it is a common assumption that sound it is collected with a single microphone on set and then fed into a Dolby machine in their living rooms to make it surround sound. This is probably due to our invisibility, both on the screen and in the credits. Cinema is after all an audio / visual experience and fittingly there is a number of box-office leading Hollywood directors who have commented that sound accounts for 50% of the experience.

The following section aims to shed light on the mystery of the sound department and their creative contribution to the cinema.

The Key Creative Roles of the Post-production Sound Department:

There are many roles in a sound post-production crew. The following is a breakdown of the roles in a typical feature film sound department.

a. Supervising Sound Editor:

A Supervising Sound is responsible for co-ordinating a film’s sound track from its inception to its delivery to the final mix. Sound Supervisors are often the only point of creative contact with the director and editor during picture editorial and are responsible for communicating their collective creative ideas to the entire sound team.

Some supervisors see their role as that of an administrator who steers the efforts of others and the overall pipeline of work towards the vision of the director. For others, the position is very “hands-on” involving tireless collecting, editing and manipulating sound effects. A third category is primarily concerned with editing dialogue and assign sound effects editing duties to sound designers and editors. Others do a bit everything; different courses for different horses. It all depends on the supervisor’s primary interest and talent. No two supervisors are entirely the same and there is indeed merit in all methodologies.
Whatever way they approach the track, the Supervising Sound Editor is often the most accountable sound person to the producer and director. Sonic envisioning, story telling ability, collaborative flexibility, technical aptitude and leadership skills are all required at each stage of the process.

b. Sound Designer:

The term Sound Designer has come to mean different things to different people.

A Supervising Sound Editor may also refer to, or credit, him/her self as a Sound Designer. Other Supervising Sound Editors employ specialised Sound Designers. Either way, a Sound Designer creates highly stylized, specialised or featured sounds such as creature vocalisations, dream/psychological sequences, specialised vehicles/weapons and background sounds for otherworldly locations.

A Sound Designer is often experimental in nature. They have a very high level of technical ability to mechanically, electronically or digitally manipulate recorded sound and use synthesizers and samplers. A great Sound Designer is sensitive to how sound can be used to manipulate an audience’s emotions and physical responses.

In the short film world, where Supervising Sound Editors are seldom found, the term Sound Designer is used to title the lead creative working in post-production sound. We are now seeing a trend internationally in the feature film world where Supervising Sound Editors are adopting the title of Sound Designer in the title credits, whilst still adopting the title of Supervising Sound Editor at the head of the sound department in the rolling credits.

c. Dialogue Editor:

The Dialogue Editor is perhaps the most important person in the post-production sound crew. They get none of the glory if they do their job well and all of the criticism if they do not. A Dialogue Editor’s job is to create seamless transitions between all the cuts, enhance the intelligibility of the dialogue and keep it all in the correct physical and/or emotional perspective. Their job is to also evaluate the quality of recordings to determine if unintelligible lines of dialogue will need to be replaced in studio session with the actor (in a process known as ADR or Automated Dialogue Recording).

With the popularisation of various software tools, increasingly the job of the Dialogue Editor has come to also involve filtering out unwanted frequencies and cleaning out clicks, pops and other unwanted noises and hums from the production recordings. Some Dialogue Editors are really good at this, others leave it for Dialogue Mixers who have traditionally performed the role and are generally the most proficient at it.

d. ADR Supervisor:

Often also a Dialogue Editor, the ADR Supervisor’s role is to supervise the studio recording of actors who are called in to re-record unusable lines of dialogue which have been flagged by the Dialogue Editor. Some ADR Supervisor’s oversee the process liaising with the actors, the director and the Recording Engineer (whose job it is to set up microphones and record the dialogue). Others are versed in directing actors and take on a more hands approach to coaching the lines out of vocal talent. Others take on the role of the recording engineer. From project to project, the job description is highly dependant on the personality dynamics and working relationship of the ADR Supervisor, Director and Actor.
The only international consistency of this role seems to be that they are ultimately accountable for delivering usable studio recordings of dialogue. ADR Supervisors need to have a heightened sense of the rhythm and nuances of spoken language so to capture all of the natural dynamics, breaths and other subtleties that can be synced believably to the actor’s onscreen performance.

e. Sound Effects Editor:

A Sound Effects Editor is predominantly concerned with editing sound effects and background sounds to sync to the picture. The sounds are often accumulated from sound effects recording sessions, sound libraries and/or from the Sound Designer who was hired specifically to create them.

There may be any number sound editors working on a single project. They edit under the direction of the Supervising Sound Editor who may also delegate specific tasks to specific editors. For example, one Sound Effects Editor might be responsible for cutting and syncing all of the gunshots whilst another may be responsible for all of the doors.

f. Sound Effects Recordist:

Whilst it is common that Sound Supervisors, Sound Effects Editors and Sound Designers are equipped and competent to record their own sound effects, many sound teams employ specialised Sound Effects Recordists to collect the types of sounds a production may need.

There are many Sound Effects Recordists in the field who are specialists in recording particular types of sounds such as nature backgrounds, vehicles or firearms.

Sound Effects Recordists are valued for their extremely high knowledge of different microphones and microphone techniques to get the best possible sounds.

g. Foley Artist

Foley Artists are the performance artists of the sound world. Their role is to perform all of the character movement sounds such as footsteps, fabric rustles, the handling of props, wing flaps, punches, etc. With carefully choreographed movements, foley artists convey the audible weight, presence, agility, personality and temperament of a character. As each sound needs to be relevant to the texture, emotion and physical weight of each scene, Foley Artists give particular consideration to the choice of shoes, surfaces, materials and props they use and are often hoarders by nature.

Versatile Foley Artists may often also contribute to non-character sound effects, such as the sounds of rain rolling down a gutter, draw bridges mechanics, horses trotting and whooshes. There is a school of Sound Designers and Sound Supervisors who work very closely with their Foley teams before starting a project to create and collect sound recordings that will be used as a starting point for further manipulation. This is becoming typical in animated or visual effects intensive films that require full sound coverage and large libraries of previously unheard material.

Foley artists also perform an integral technical role. Sound departments create tracks know as M&Es (Music and Effects). The M&E is used to export the film to foreign film markets who require a full sound track without the native spoken language. The idea being that when all of the dialogue is re-recorded in, say, German, none of the footsteps or door knock sounds disappear with the original English language track is omitted.
h. Foley Engineer

A Foley Engineer works closely with the Foley Artist. They cue, record and often edit the Foley in a recording studio adjacent to the Foley Studio. They are also in tune with the power of Foley and the working rhythm of the Foley Artist.

i. Assistant Sound Editor

The position of ‘Assistant Sound Editor is interpreted differently in different studios and in different parts of the world. Typically the role includes naming audio files, creating catalogues, liaising with picture departments about technical deliverables, double checking file formats, taking calls, notes, returning emails for the sound supervisor, conforming audio and generally keeping everyone happy with a sunny disposition.

Andrew Bock said that as part of his role as a First Assistant Sound Editor, he facilitates the Picture Editor with the ability to try picture changes at the mixing stage to avoid losing time going back and forth to their edit rooms.

j. Re-recording Mixer.

Re-recording Mixers provide Directors with the opportunity to see and hear their films for the first time as they will be seen and heard by audiences in theatres. They often work in a large commercial cinema sized studio with a mixing desk in the centre of the theatre. They represent the audience’s listening perspective of the final film and are responsible for steering the film’s sound track to the finishing line.

On a technical level, they are invaluable members of the team due to their incredible technical ability to use mixing desks and their often-freakish understanding of frequencies, dynamics, harmonics, acoustics and reverberations.

On a creative level they bring an informed outside perspective to a production. They have an advanced understanding of the conventions of story telling and are attuned to the audience’s emotional responses. They can also advise or determine if a scene should be driven by music or sound effects or both to better accommodate the story. They carve out a path for the listener and deliver the final track heard in theatres.

Methods of Collaboration:

In many corners of our industry, there are people who are concerned with the ‘right way’ and ‘wrong way’ of working. Of course there are technical standards that govern our practices such as phase incoherency and SPL calibration levels. However, after having been exposed to so many different workflow and creative methodologies which all produce awesome and different results, I can only conclude that all doctrines pertaining to methods of collaboration and hierarchies within the sound crew are becoming somewhat obsolete in most parts of the world. Every crew is different and they should be allowed to be. Coming from a guerrilla filmmaking background, I believe that filmmaking is often about finding what works and rolling with that. I praise this wonderful diversity in our international sound community and I am certainly not alone in feeling this way.

Traditionally, there has been this notion of creative boundaries within the sound department. That is, Sound Editors prepare the material by cutting film or tape to picture. Foley Artists make Foley. Dialogue Editors cut dialogue. They all deliver to the Re-recording Mixer who then makes all
decisions concerning panning, level, equalisations and reverberation. What I have witnessed over the past few months is that these boundaries between specific tasks are all being, and given the dominance of Digital Work Stations will undoubtedly continue to be, reinterpreted.

A Supervising Sound Editor may also be the Director's trusted Dialogue Editor, ADR Supervisor and Re-recording Mixer. Other Directors prefer to work with a Sound Supervisor that takes an administrative role throughout the editorial process and then become the lead creative voice during the mix. Role flexibility is not exclusive to sound supervisors. In Australia I have worked with Dane Cody who is a very talented Location Sound Recordist who also delivers beautifully edited dialogue tracks and Adrian Medhurst, who is already one of Australia’s best Foley artists, is an Emmy nominated Sound Effects Editor and is also starting to gain attention in Australia for his re-recording mixing ability on the SAFC’s Harrison.

The accessibility to mix within the DAW has created opportunities for many immerging Sound Engineers to experiment and develop their skills in different roles. This kind of multi-tasking allows sound people to exercise different parts of their brains and talents at different stages of the process. The end result is a smaller team; and this has understandably fired much controversy.

The small team multi-tasking approach is heavily criticised in many corners of the industry for being exclusionary and for devaluing specialists. Whilst these are both valid arguments, the financial reality facing ambitious independent productions is budgets are tiny and smaller teams with broader skill sets are more affordable. Furthermore, they can be employed for longer periods. This gives directors more time (than is typically given to an indi-filmmaker) to fully explore and realise the creative potential of a film’s soundtrack.

However, by all observations, this tendency towards smaller teams is almost entirely inapplicable to sound departments on large visual-effects heavy films. Whilst crews have gotten smaller on these pictures over the years, schedules are far too short and demands are too high to warrant very small crews. Furthermore, as release dates are firm, and pictures keep changing, in most cases it is impossible to complete the picture without a large dedicated team of specialists.

**Mixing in the Box:**

Mixing in the box refers to mixing audio within the same Digital Audio Workstation (DAW) environment it was edited and is one the most hotly debated topics concerning the film sound industry today.

For years DAW and hardware developers have been promoting the notion of mixing in the box via control surfaces instead of mixing consoles. Whilst many mixers have embraced this, particularly those working on independent films and advertising, there is still much hesitancy in the feature film establishment.

Central issues that affect many great mixers is that software DAWs create cancellations in the output signal and other undesirable harmonic effects in the way they sum tracks together. Pro Tools has just released an algorithm called HEAT, which is supposed to have rectified some of these issues, but I cannot personally verify this at this stage as I am yet to play with it.

Another major issue facing many mixers around the world the fear that it reduces their contribution to the film – particularly as many directors and sound designers can become precious about reverb, pan and EQ sweeps created during sound editorial. However, as sound designer Wayne Pashley puts it, “there is simply no substitute for experience. This new workflow gives more freedom and
flexibility for the mixer to concentrate on the creative role of story telling rather than getting bogged down in all the fiddley stuff like panning”. Re-recording mixer Pete Smith also spoke of his support for this process. However he warned that pre-panning add extra time to the mix to re-pan everything if the pans are not masterfully executed in an acoustically treated environment before they are brought to him.

New directors (the world over) have taken to this idea as they can listen to their film’s final track being built in a 5.1 or 7.1 sound editing/design suites. Many mixers have cautioned the fact that pans, reverb and eqs all sound profoundly different in small editing rooms than they do in the large dubbing stages. Whilst this is certainly the case, many innovations in room treatment and monitor alignment tools (which are topics slightly beyond the scope of this paper) are providing very good results. At almost every studio I visited, it seems that more planning is being put into designing and building editing suites. Whilst sound can never be accurately monitored to be exactly like any other room, it can come close enough by manipulating the tonal balance, delay times and placement of the monitors to replicate that of a dubbing stage.

Paul N.J. Ottosson’s very controversial work on Hurt Locker (2008) is testament to the practice of mixing in the box. Ottosson upset many sound people by, not only mixing the film himself, but by mixing it in his editing room on a control surface. He only used a mix theatre to cross-reference the tonal balance of the sound and accuracy of pans. Ottosson’s double Oscar victory last year for editing and mixing sent shockwaves throughout the sound community as it critically validated mixing in the box – and indeed mixing in an editing suite¹. On Hurt Locker, Paul and director Kathryn Bigalow had developed a collaborative synergy during the production of the track. Paul was the first person hired on the film from pre-production and the development of the track had spanned the entire production. Kathryn was so pleased with the way the track was taking shape in design suite that she believed it would set the production back too far to disassemble it and rebuild what they already had. So under the request of the director, Paul took the track to the finish line.

Hurt Locker is a work of art with creatively sincere intentions. It was made with a comparatively small team of artists who were interested in investigating creative possibilities and owning the work rather than pumping it out through the usual pipeline. This film was something of anomaly from preproduction, it suffered a tough shelf life without a distributor only to break through and dominate critical acclaim in 2009. Rather than criticising it’s sound process, perhaps we should help celebrate its victory in thinking outside of the box – albeit, rather ironically, by staying in it.

This has inspired and validated such practices for a whole new generation. Even established Sound Supervisors like Richard King, used an all DAW pipeline right up the final mix on Inception (2010). The final mix was undertaken with a ‘hybrid’ mixing solution, which implemented both a control surface and traditional mixing desk in the dubbing stage. This afforded King the ability to keep all the tracks virtual whilst the mixers could use a traditional mixing console to fade track groups or busses and add reverberations. This hybrid method is gaining popularity with many Sound Supervisors and Re-recording Mixers. I imagine we will start to see a lot more of these types of Hybrid Solutions popping up in major studios around the world until a full DAW pipeline will inevitably become the new standard.

In 2010 another landmark shift towards mixing in the box was announced as digital editing conglomerate AVID acquired mixing console manufacturer Euphonix. Will Euphonix mix desks become control surfaces running EUCON exclusively or will there be a shift towards the

¹ Producers: please read special note on page 19 about mixing in small spaces.
development of Pro Tools based hybrid desks with external summing circuitry? Speculation, excitement, fear and assumption are indeed rife.

It is ninth and latest incarnation, AVID’s industry standard audio software Pro Tools has expanded its compatibility to third-party ASIO-compatible audio interfaces. For many, this is hopefully signalling to greater software compatibility with the next generation of third party mixing desks. Time will tell.

The Dominance and Compromises of Pro Tools:

After its savage assault on analogue tape in the late nineties, the audio recording, editing and mixing application, that has come to be known as Pro Tools, is the industry standard. Pro Tools is, without doubt, a brilliant editing environment. It has made some of the greatest sound designs in history possible. Whilst its flexibility with editing, track laying, mixing and sound manipulation is truly admirable, the industry’s unrelenting loyalty to Pro Tools has blocked out many other editing solutions that offer very powerful alternatives.

Nuendo, Logic, Pyramix and Fairlight, amongst others, appeal strongly to many in the sound community but they are regularly disqualified because of file and automation compatibility issues with the rest of the dominant Pro Tools driven sound community. Pro Tools 9 have claimed to have increased compatibility with other DAWs – hopefully they have resolved the issues of translating fades, edits and automation across other platforms.

Pro Tools’s industry strong hold is not likely to change anytime soon given the incredible marketing machine at parent company AVID. As mentioned earlier, Pro Tools is now interfacing with third-party ASIO-compatible audio interfaces. This single move may have earned their seat at the top for at least the next decade. It seems absurd mentioning interface compatibility as an innovation in 2010 as many other very powerful applications boasted this at least a decade ago. However, it is still exciting as it will undoubtedly spur a boom in wonderful new third party interfaces appearing in Pro Tools based film and music studios around the world.

Furthermore, AVID’s recent acquisition of mixing desk company Euphonix has sent shockwaves throughout the industry. The buzz surrounding this merger should also keep the Pro Tools brand alive and well for at least the next little while. So if we have to be stuck with it, I thought I would use a portion of this report to ask AVID to revise and add a few things to make our working processes a little smoother. This list was compiled in collaboration with Derek Vanderhorst and Stephen Gallagher.

1. Can you please introduce ability to open multiple sessions so we can rebalance sessions or even cut similar scenes and copy/paste between them?

2. Can you introduce automation for the bussing assignments?

3. What about clip based automation?

4. A 64 bit floating point would be nice, too.

5. At least 1000 tracks even if voices are limited. This would be great for rebalancing and carrying all the elements to the stage in one session.
6. More than 192 voices, please. Most other audio editing applications are dependent on the CPU. Can’t delay compensation be used to free these shackles?

7. Can we have Audiosuite handles and non-linear processing ‘undos’? It’s really frustrating for sound designers and my desktop is covered in screen shots so I can keep track of my processes manually. Also, and ‘undo’ for accidently deleting plug-ins would be great too.

8. LKFS metering in Phasescope?

9. A persistent monitor section when opening/closing sessions for things like headphone mixes would also be nice.

10. So would Multi-mono plug-in presets that are actually presets for all mono components.

11. Please add the ability to add busses from the mix window.

12. Customizable key commands would be great to provide more efficiency for our talented brothers and sisters who prefer to work with other DAWs.

13. Please let us save clips with the layout automation in tact to drag and drop into another session like you can in Nuendo.

14. When will we be able to right-click on a stereo region to flip the left and right track?

15. Please let us be able to record the sound the ‘scrubbing tool’ makes. This will be particularly useful for sound designers who like to perform their sounds.

16. Can you please give us the option to bounce a project without having to sit through it in real-time. Make a warning pop out at us if you are concerned about anything, but please give us the option to hit “ignore”. Most importantly, don’t make it crappy so you can say “I told you so”. Other software companies have been making really good fast exporting ‘options’ for years. Please make it like that.

Thanks.

**Conforming Audio to Picture Revisions:**

We live in an age where picture edits are never final. Even after a film is finished and released, directors and editors can be found the world over revising the cuts to their films. Creative indecision, obsessive fandom and/or studio/distribution interference, can often lead to many alternate versions of the same film under the guise of a regional or director’s cut. Most notably, many of us own a DVD box set with a favorite sci-fi film from the early 80s with no less than 4 versions of the same title.

In these indecisive times, and thanks to the ease in which modern picture editing software facilitates picture revisions, film edits are seldom locked before or during the sound edit. This is not necessarily a bad thing for sound departments as it is increasingly giving them greater involvement in the creative direction of the picture edit to make suggestions about how to link shots with sounds or how to alter the rhythm of the picture to match the rhythm of a well executed sequence of sounds. This type of collaborations between the departments often results in a more cohesive film that reads with more fluidity.
However, conforming (and re-conforming) audio to picture revisions has become the bane of many sound departments, particularly in the independent world. Unlike a picture edit, which is simple to cut or extend against a timeline with a click of a mouse, any changes to picture often involves the re-cutting of many sounds to make the scene work (again). As a scene can be made up of any number of sounds (in action films this may be in the hundreds or thousands of individual sounds), it is very time consuming and labor intensive to accommodate such cuts – particularly if a scene is to be completely re-envisioned.

Granted there are very useful software tools available on the market which can give accurate frame counts of the changes made and other software packages which can re-sync sounds to picture to some degree. These have been a godsend to dialogue editors particularly. However, lets be frank: neither option really makes the job any easier in a complicated sound effects session. So much time is spent crafting the rhythm of the sound design, the way things weave in and out around dialogue and music and the way the whole thing holds together as a composition. When picture cuts are revisited, often the sound design needs to be reinterpreted to accommodate the new tempo of the cuts. This invariably results in rethinking creative decisions and in extreme cases, starting the sound edit from scratch (albeit using the library that was compiled to resolve the scene the first time round). Software is incapable of make these kinds of creative decisions and it is my view that until it is able to, the ‘automated’ option is almost completely redundant to sound effects sessions.

Whilst very few sound departments would want to deny filmmakers the opportunity to make their films better by reworking the edit, the additional hours of skilled labor involved to meet the picture changes are very rarely acknowledged in independent filmmaking and there have been countless reports from all over the world about productions refusing to pay for these additional hours due to a complete lack of understanding as to what a ‘simple’ conform involves. The most common argument for not paying for the extra is “you agreed to do it for that price”. Therefore, it is vital for the development of our industry and to help stamp out this blatant abuse of labor that sound departments exclude conforming from contractual agreements with productions and charge for additional hours under a separate agreement. Whilst this advice is probably irrelevant to those working at the highest level, mid and low budget sound practitioners stand to benefit greatly from this simple contractual revision.

**Standard Definition and High Definition Conversions and Deliverables:**

In this time of transition from SD to HD, film and television sound departments are now required to deliver content in both stereo and 5.1 (and in some cases 7.1) for the various territories and Cinema/DVD/Blu-ray/TV formats. As each version requires a separate M&E and different regions require different frame rates, content may be delivered in excess of 10 variations. Each variation needs to be monitored, adjusted, printed and tested before a final delivery. This may add up to a many weeks of additional work to the tail end of a project after it has been signed off as ‘complete’ by the production.

As the number of delivery requirements has exponentially increased, sound post-production budgets have rapidly declined all over the world. Similar to the case of conforming audio, there have been many reports of productions refusing to validate the extra time involved in providing deliverables with adequate financial compensation. The common misconception by producers has been that there is some kind of magical button on the mixing desk that you can push and the ‘machine’ spits out all the versions you need. Sadly there is no such magic button – that is unless you count the mixer that works tirelessly to meet these requirements with years of experience,
knowledge and skill. However it should be noted here that mixers generally hate being referred to as buttons.

Alas, conversions and deliverables also needs to be clearly explained and stated in contracts before commencing projects so that productions are fully aware that additional hours worked after the native language cinema mix is ‘signed off’ will incur additional costs.

**Many Colours of the Plug-in Rainbow:**

Software Plug-ins dominate audio processing in all sectors of the international film sound community. The dominance of software based audio processing is due largely to their accessibility (both in terms of price and the ability to download over the internet) and performance. Having said this, there are still a number of very powerful hardware synthesizers, samplers, outboard reverb and compression units, which can produce astonishing results. However, these are many times more expensive than their software counterparts. Many manufacturers of hardware products have developed or have licensed software versions or their products. In many cases, these software products are fun to use and can output great results but they are often sonically inferior to the classic hardware in which it is designed to imitate.

What is exciting about plug-ins, is not their ability to mimic hardware, but rather that they allow the user to manipulate their sounds with a visual graphic interface. This has freed many craftspeople from the technical side of sound engineering and has allowed them to focus more on their creative side and play.

Most popular amongst this new generation of plug-ins are the ‘Worldizing’ applications. Convolution reverb plug-ins are particularly popular. They allow the user to re-create real world reverbs with impulse responses. Other popular tools include Doppler and surround plug-ins which automate the tones and frequencies of sounds as they are panned to one part of the room to the next.

From a pure sound design/creation perspective, there is a plug-in for every purpose from creating a simple ‘futzed’ phone voice to allowing you to access, perform and manipulate your sounds live from a musical keyboard. A multitude of third party software developers have popped up in recent years creating very effective and simple to use algorithms which are widely accessible online. Furthermore, sound designers like Will Files and Dane Davis have been vocal about the creative possibilities can exist if you push the plug-in beyond its intended use. These new creative directions and sounds are, in turn, inspiring software developers to respond with new plug-ins which address these new aesthetic possibilities.

However, there is much criticism that this dependence on visual manipulation of sound has taken away from the experience of making judgements by ear. That traditionally, editors and mixers were more in tune with the pictures on the big screen and made judgments more instinctively from picture rather than hunching over a small screen and looking at visual representations of a sound.

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2 ‘Worldizing’ is a term coined by Walter Murch to describe the re-recording of a sound from a speaker in an acoustically appropriate environment. The reverberations are captured in the natural space to give the sound effects more spatial realism.

3 An impulse response is a recording of a sharp transient sound (ie. hand clap) or frequency sweep in any given acoustic environment. The recording contains special, tonal and reflection information that can then be used to digitally affect an audio signal.
Further criticism has come from mixing veteran Michael Minkler. He is particularly concerned about the over-use of plug-ins; stating that most sound editors and mixers are relying more heavily on the latest gimmicks in sound manipulation rather than recording the right sound (or combinations of sounds) in the first place. He further stated that over-processing sounds often results in undesirable audible artefacts and glitches which makes the track sound too “digital sounding”. His final words on this issue were: “Many people are choosing convenience over quality. They are not listening!”

There is merit in all of these criticisms.

However, the choice of sounds and the use of plug-ins are ultimately at the discretion of the user. Over processing, elaborate plug-in chains, combinations of software and hardware processing and even plain plug-in abuse can create great sounds and terrible sounds. It is this type of creative discretion that ultimately separates the artists from the amateurs.

**Work Place Ergonomics and Environmental Practices - Innovations and Crises:**

Chronic neck, back and wrist pain are serious hazards when working with sound. It is great to see so many practitioners taking it seriously by improving the ergonomics of their environment. There are a number of high-end totally adjustable desk chairs on the market designed to improve posture. These are typically super expensive. However they are also a worthwhile investment into your professional longevity. Also popular amongst sound editors and mixers is the use of computer track balls, graphics tablets and touch devices instead of computer mouses. These take a while to befriend but they offer reduced wear on your wrist. Sound editors, like any professional hard at work on a throne, must acknowledge the detriment that this type of work has on the body and seek physical activities other than listening.

In many parts of the film sound community, there is also an environmental crisis of unnecessary paper wastage. Mix, ADR and Foley cues sheets and random redundant copies of scripts have been tearing down old growth forests for decades. Shockingly this practice continues in 2010. Indeed I praise the diversity in all of our methods, however we should all be more conscious of our environmental imprint. We live in a time where most editing and mixing studios are littered with laptops. Surely, digital notes are sufficient for most applications. Aren’t they?

Now, back to film sound…

**Virtual Facilities (or the Rise of the Home Studio):**

Given the accessibility of computers and software, sophisticated home studios have flourished across the globe. Thanks to high-speed internet, remote data storage and video conferencing software, sound departments can be spread all over the world. There is good and bad in this new model.

On the up side, as Sean Garnhart puts it, “it’s great if you have a young family”. Sean often works in his Dolby approved room above his garage in a beautiful leafy street in New Jersey. Furthermore, his process sometimes involves working with others who also enjoy working at home to be closer to their families. When Ben Burtt accepted the Charles S. Swartz Award this year, he said:

“…we know in post production you’re in a very tough business that takes a lot of sacrifice of your time and energy. I’ve never fully solved this problem, but I’ve learned over the
years that you have to make time for your loved ones. That you have to try to get home for dinner and be with those kids across the table at night if you can. And I know the business doesn’t favor that kind of activity…it doesn’t put an emphasis on that. But you find in many many years that those loves ones that you leave at home, that are waiting for you, matter a lot more ultimately than the films and shows that you do. So try to find a balance there. Try to find projects that allow you to do that, or make decisions that allow that to happen.”

Perhaps the virtual studio is the answer to the family oriented amongst us and can help create that balance whilst still being very collaborative with the sound team and the director. The flexibility to live out of cities, choose your own working hours and even move around has been the answer to many domestic prayers.

However it is not without its shortcomings.

Sound facilities have long been institutions for education. Daily interactions amongst senior and junior sound engineers has formed the foundation our industry today. Mixing and editing equipment was far too expensive to have in homes and everyone learned on the job by watching and speaking to each other. Whilst it is very true that internet forums and audio schools have popped up in every corner of the world in the past decade, both do not suffice for proper industry ground training. I fear that if virtual studios are to replace conventional editorial facilities, less audio conversation will take place and knowledge will be lost.

Also a few people have spoken about the loneliness and lack of inspiration when working from home. One of the best things about working in a facility is that you can feed off each other’s enthusiasm, energy and ideas – sound is after all a collaborative effort. Furthermore, most homes are a minefield of distractions, human or otherwise, and it takes a great amount of self-motivation to get out your best work.

All criticism aside, home studios are a very valid and workable option that has produced some very awesome professional results.

**Producers please note:** working from home is only effective if the editing room has been properly aligned to industry standards. This is an expensive process that requires adequate remuneration. Furthermore, Mixing Facilities or Dubbing Stages are still the only way to produce a reliable final mix which will stand up to international standards of exhibition. Sound which is prepared in a small or untreated space will produce many surprises when screened in a commercial theatre and it will make the entire film seem unfinished and poorly resolved.

**7.1 - A Practical Innovation in Surround Sound?:**

Surround Sound has seen many incarnations and configurations over the past half-century. The standard for almost two decades has been the very popular Dolby Digital 5.1 format. This includes three channels in the front of the theatre behind the screen (Left, Center, Right), two in the back (Surround Left and Surround Right) and a discrete low frequency channel which feeds the subwoofer, which is generally at the front of the room behind the screen and adds the all important “.1” to the equation. Although we have seen many formats come and go during the reign of 5.1, most notably Sony’s very ambitious eight channel SDDS format, the 5.1 configurations has long been a good compromise for filmmakers and the exhibitors alike.

As the demand for a more immersive 3D experience has increased in recent years, the limitations of 5.1 are starting to become apparent to film sound enthusiasts in the animation and VFX
dependant sectors. Concerns have included that 5.1 does not offer enough discrete channels for panning with pin-point directional accuracy around the room. Another concern is that sound effects and music are often competing for dynamic and frequency range in the limited surround channels.

With the release of Toy Story 3 (2010), Pixar and Dolby have been promoting the 7.1 format as a new standard for 3D filmmaking arguing it creates a more immersive experience. There are a number of other 3D productions, including Mega Mind (2010), Gulliver's Travels (2010) and Tron (2010) which are all at the forefront of embracing this new technology.

7.1 adds an additional two channels to the popular 5.1 format. Where the 5.1 format fed a left and right signal to the surround speakers which are mounted to the walls to the side and behind the listener, 7.1 outputs a discrete stereo pair to the walls and another to the rear of the theatre (Wall Left, Rear Left, Rear Right, Wall Right). The market viability of this product to exhibitors is very feasible as the upgrade uses the same speaker configuration as 5.1. This means exhibitors need only make a simple software update to their exiting Dolby processor to benefit from this new technology.

It is commonly agreed by those who are trialling 7.1 that the addition of discrete wall speakers have given more freedom to pan off screen without distracting the audience. In speaking with mixer Andy Nelson about the advantages of this new format, he said that it allowed him to create more separation between the music tracks and effects tracks in the rear channels. On the mix of Mega Mind, he only panned the music to the walls leaving the back of the room free for Anna Behlmer's rear sound effects mix. This created opportunities for sound effects, in music driven scenes, to work together rather than compete for stage time.

So the technology is good and economically feasible enough to become the next industry standard. However, many argue that new channels will never suffice for a properly aligned room. Poorly aligned rooms tend to exacerbate bass issues, inaccurately translate pans and introduce resonant frequencies. It is commonly agreed in the sound community that exhibitors have a long way to go in delivering accurate 5.1 reproductions before 7.1 or any other format will be of any benefit or relevance to the majority of cinemagoers.

Further resistance is evident in arguments that 7.1 is only beneficial to those sitting in the 'sweet spot' of the theatre; that audiences sitting close to the front are too far from the rear channels to hear them and audiences at the back are over exposed to them. Whilst there is merit in this argument, the same could be applied to sitting too close to one side in a 5.1 film or even getting neck pain from trying to follow the action from the front row.

Although we all love them intensely, a cinema theatre, by design, is not a perfect spectator arena from every seat in the house. It is advisable (and common knowledge) that one must get tickets early to guarantee a good seat at a popular film. The sound department, much like the picture department, cannot account for poor floor planning in theatres. Instead it is our responsibility to make the best work we can, with the best tools we have available, in the hope that the greater majority of spectators hear the sounds as they were intended.

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4 There is also a 22.2 and 10.2 format available at the moment but these require speaker reconfigurations and most cinemas are less likely to embraced them due to costs and limited industry support at this stage.
Subjective / Objective Atmospheres:

There are many leading sound departments who are using the tools of layering, panning and reverb to create dramatic and ever-evolving atmosphere tracks (AKA “backgrounds” or “BGs” for our American cousins).

Recent exquisite examples have included *No Country for Old Men* (2007), which has a constantly modulating wind track which rises and eases with the tension of the drama, *The Bourne Ultimatum* (2007), *Slumdog Millionaire* (2008) and *The Wrestler* (2008), which posit the audience within the characters physical listening position and, *The Lovely Bones* (2009), *Black Swan* (2010) and *Harry Potter and the Deathly Hallows* (2010), which use dialogue as a sound design element to emphasize a character’s distorted perception of the sound around them.

These films also seamlessly slips between objective and subjective perceptions of sound – which is a welcomed departure from the stagnant loop that is commonly used to establish a location before it predictably recedes behind the dialogue to create a simple bed that says nothing about how the characters are feeling and how they perceive the world around them.

Perhaps the most artfully executed and beautifully composed example of this is in recent years is found in an independent New Zealand film called *Boy* (2010); which was sound designed by Tim Prebble in Wellington and should have been nominated for a Best Picture Oscar. I don’t want to spoil this film for anyone who has not yet had the to see it by saying anything about the story but I cannot recommend this film enough and I suspect it may very well be my favorite film of 2010…

Debates and discussions about film lists aside, the atmosphere of *Boy* is bright and lively with insects and birds. At a pivotal plot point, the vibrancy and animal life in the atmosphere track is stripped right back and drowned out with long (apparent) silences and emotionally hollow whips of wind. From this point onward, the main character (and his audience) see and hear the world in a new perspective. As the character becomes more involved in his internal family drama, the external drama of his natural environment fades into the distance beyond the scope of his (and our) hearing. In this way, the sound of the environment gives emphasis, even on a subconscious level, to the emotional plot points of this character driven piece.

Silence:

Silence is a wonderful tool for creating uneasy tension and anticipation. It is also a brilliant devise for drawing audiences into the drama. Silence also provides a broad dynamic range for sounds to leap out and bite without clipping red on the meters.

Whilst the creative power of silence has long been widely praised within the film sound community, there is debate about what silence is. Many sound editors and mixers have argued that you can never have absolute silence on the track because it is ‘technically’ incorrect. I regret that I forgot to ask anyone why this technical requirement exists and the Internet was not its usual helpful self on this topic either.

Supervising sound editor Wylie Stateman made the opposite argument. He has an immense love for silence and commented “absolute silence is the only real silence and we often explore it all the way to 0".
Performing Sound Effects to Picture with Fun Machines:

Performing sound effects to picture using a sampler or keyboard was a fairly popular method used by sound designers all over the world in the 1980s and 90s. Whilst MIDI keyboards can still be found in most sound design suites today, most sound effects crews have become increasingly dependent on cutting sounds to pictures along the time line of the DAW with a computer QWERTY keyboard and mouse. Click.

Having said this, there are many notable sound designers who are keeping the sampling spirit alive by performing sounds with MIDI triggered software samplers.

This year sound designer James Mather used MIDI sampling to build the atmosphere tracks for the latest installment of *Harry Potter* (2010). He collated a large collection of drones, sirens, insect and rings, which he used to trigger at different times and at different pitches up and down the keyboard. This technique creates pitch variations in the sounds that keep the track from sounding stagnant. Furthermore this technique can allow the user to slip and morph into the atmosphere of other scenes in much the same way a DJ can slip between tracks using pitch and time controls. The limitation of working in this way is that the sounds get mixed and recorded into a single track as they are being performed – this can be very restrictive for mixers. However, if the sounds are performed in several passes to keep elements separate, each stem can be mixed separately.

Another innovation that has found its way into the hands of such sound designers as Ben Burtt, Gary Rydstrom and Tom Heuzenroeder is the Kyma synthesizer. This tool allows its user to manipulate samples, tempos, dynamics and other parameters with unsuspecting audio controllers such as a Wacom Graphics Tablet, iPad or Nintendo Wii motion sensing handsets. This was most famously use to create the pitch bends in the robot vocalisations in Pixar’s *Wall-E* (2008)

On the animated film *Robots* (2005) Sound designer Sean Garnhart created the feet sound effect for each type of robot and then performed the sounds to picture with his keyboard. Whilst Sean does not recommend this practice for most live action applications, sampling in this way allowed him to create highly stylized sounds which can then be performed with a more performance based feel for the character’s movements and personality. The sensitivity and dynamics of the sampler keyboard also allowed for subtleties in the performance that is often very difficult to capture with a keyboard and mouse.

On topic of Foley and samples, on the *Happy Feet* films (2006 & 2011) Foley Artist John Simpson has had the arduous task of matching every tap, toe, heel and slide of the tap dancers that were used in the motion capture animation sessions. Luckily, the sound of the feet was recorded and corresponds with the final animated movements in the film. This allowed Foley engineer Jason Hancock to record John’s sounds for the dancing penguin’s heels, taps, toes and slides on ice and cut and feed them into software designed to replace the sounds of poorly recorded drums with clean sampled ones. With a little additional editing and clean up, this process yielded impeccable results.

Hopefully sampling is an area that Foley Artists will explore more in the future. Given the range of sensitivity possible with these tools, I am interested to hear the dynamics Foley Artists could bring to a ‘designed’ footstep or other physical events.

Can an atmosphere be performed with the body? Does anyone know if Robin William’s ‘Body of Sound Jacket’ in *Toys* (1992) was ever attempted by an audio manufacturer?
Wouldn’t it be great if Foley studios where equipped with a matt on the ground that can translate footsteps into trigger signals for a sampler ☺?

**Location Foley:**

Foley is traditionally recorded in a Foley Studio. A Foley Studio is an acoustically silent space designed to allow Foley Artists to record their sounds without any background noise. In the last few years, however, the benefit of the silent Foley studio has come under question by many people in the international sound community.

A few Foley teams are leaving the confines of their studios to explore the exciting frontier of ‘Location Foley’. High quality portable recording devices and laptops/audio interfaces have created new possibilities for Foley artists who prefer to record their feet, bodies and props in the actual or similar sounding locations as depicted in the scene they are working on. This provides a number of benefits to the track. Firstly, it captures the tone and natural reverb of the location allowing the Foley recordings to seamlessly blend in with the sync track. Secondly it gives additional ‘character’ to the overall track as background layers are recorded vicariously in the recordings of Foley. These location recordings also add depth to M&Es as they provide a more real-world bed for the often too dry foreign language ADR track.

Ren Klyce famously uses a lot of location Foley on most of his films. On *Panic Room* (2002), three microphones where used in the location Foley sessions - the microphones represent the centre, left and right speakers in a theatre. The idea was to have one microphone focussed on the action and a stereo pair recording the space on either side. Whilst the recordings proved to deliver a wide LCR image, the end result was often too wide for the image on screen, and in the premix the positions of the discreet Left and Center Microphones had to be towed-in a bit to better fit the screen action. So even though the original strategy spread the Foley too wide, the location Foley recordings did prove to be a very successful method for making the Foley more transparent and the track more brooding.

In Australia, Foley Artist Gerry Long has taken this idea further by creating a very portable recording rig complete with wireless video glasses and in-ear monitoring. This headset allows him to move freely and still have constant viewing of full VGA pictures.

This technique places emphasis on scouting out the right location for the right sound. For the adventurous explorers amongst us, this style of Foley opens new creative possibilities to experiment with and, most importantly, it has created the opportunity to go outside and play.

**Ideas and Innovations concerning the Dialogue Track:**

There are many debates and innovations concerning a recording, mixing and editing a film’s dialogue track. The following section highlights the key points that arose during the course of my research:

a. **Panning Dialogue**

There are polar opinions throughout the industry about panning dialogue out of the centre channel. There is particular hesitancy amongst the majority of sound re-recording mixers because of the well-placed concern that speakers in many commercial cinemas are aligned poorly and will therefore reproduce the pans with compromised accuracy. Furthermore, there is widespread
concern that panning dialogues, particularly into the surround channels, creates a distraction from the ensuing narrative on the screen. This is particularly true to tracks which have a low signal to noise ratio. The trouble with this is that wherever the voices are panned, the background sounds that are vicariously recorded to the same track are incidentally also panned creating an imbalance in the atmosphere's image.

By contrast, many others are excited about the creative potential for panning dialogue and indeed there have been many ambitious and well-executed projects. Gary Rydstrom’s breakthrough work on *Strange Days* (1995) and *Toy Story* (1995) and Randy Thom’s sound for *The Incredibles* (2004) are commonly cited amongst the international sound community for breaking the shackles of the dialogue in the centre speaker.

More recently the dialogue in *District 9* (2009) and *Legends of the Guardians* (2010) were panned and finessed with great precision and to great effect, which has gotten a lot of people very excited. I am also very excited about the possibilities of dialogue panning. However, I cannot ignore the cautions of so many great mixers who have time and time again highlighted the simple fact that exhibition room alignment is a serious issue.

It is infuriating that poorly calibrated cinemas are limiting the creative exploration of dialogue placement for many cautious sound people. The most common problem at exhibition in cinemas is that rear channels are often turned up too high to promote the theatre's investment in 'surround sound' whilst the sub woofers are kept low as not to interrupt the audience in theatres inches away on either sides of the walls. Home cinemas almost always suffer from poor speaker placement and sub woofers that are grossly oversized and over-powered - so much so that bass reproduction often sounds better in their neighbours' living rooms than it does in their own. Common to both cinemas and home theatres is poor room acoustics. That is, the way sound physically interacts with a room’s natural delay time, resonant frequencies and standing waves. Poor room alignment can introduce a plethora of sonic problems can all effect the fidelity of panned dialogue.

**b. Innovative voice recording techniques in animated films**

Animation traditionally involves recording an actor’s vocal performances, often in isolation from the other actors in a sterile voice-recording booth. Whilst this approach to sound recording offers the highest fidelity and controllability of a sound in post-production, vocal performances can often fall lifeless or flat and can be utterly uninspiring and even frustrating for the poor animator whose task it is to bring theatrical life to a over-priced voice that has no pazazz.

In very recent years both *Where The Wild Things Are* (2009) and *The Fantastic Mr Fox* (2009) have benefited from an experimental approach to the recording of an actor’s vocal performance.

Under the supervision of Sound Designer Ren Klyce, the actors on *Where The Wild Things Are* were brought into a recording studio and recorded with lavaliere microphones attached to sweat bands on their heads – to prevent rustles on the dialogue track which may be introduced by the clothing or impacting of bodies. The actors were directed to physically act out the scenes and interact with many soft props to replicate accurate vocal exertions and breaths. Furthermore, the fact that each actor was recorded individually into a discreet track provided the opportunity for panning dialogue.

To similarly capture natural vocal performances, Supervising Sound Editor Jacob Ribicoff said that on *The Fantastic Mr Fox*, the actors where recorded on a farm in the traditional method of recording location sound. Attention was given to record the scenes in acoustically relevant spaces.
to the film and to capture the natural reverb of the dialogue with background sounds that ultimately complement and provide a bed for building atmospheres and EQ'ing Foley.

c. Dialogue Intelligibility vs. Emotional Intent

There is some contention amongst dialogue editors (and indeed with some directors and distributors) about the creative value of unintelligible dialogue.

It is without question that in a dialogue driven narrative, intelligibility is crucial to follow what is happening. However there is some debate concerning the value in unintelligible dialogue if the emotional intention of the dialogue is conveyed visually. For example, the Australian greeting “howya’gaan?” is often replaced with an ADRed “how are you going?” for the fear that it will prevent international sales. This seems particularly condescending to the intelligence to any English speaking audience member – particularly when the other character in the scene answers, “Fine thanks, how are you?”

Another debate, which commonly arises in discussions of intelligibility, is when several simultaneous lines of dialogue are spoken in anger and the dialogue track becomes cluttered. As in the case of colloquial phrases, many argue that what is being said is often less relevant than the emotion that is being conveyed in the delivery. This is also applicable in scenes when an actor utters random splatters of language before they break down and cry. In a real world situation, it is rare that we would witness a friend break down and then ask them to repeat that last bit again – we get it with our sixth sense for non-verbal (albeit vocal) communication.

Ultimately however, decisions made in this area are outside of the sound department’s creative jurisdiction. The director, picture editor, producer, studio and marketing/distribution channels will all have influence over outcome of any decisions made about dialogue intelligibility before it is the decision of the sound department.

The Subwoofer:

The techniques and applications concerning the subwoofer are quite varied from practitioner to practitioner.

Creatively speaking, the subwoofer is a very useful tool. It makes the cinema experience physical. With the pressure from its drivers, it can vibrate your belly and impact your chest. It can alert our instinctual response to a looming danger, immerse us into the chaos of a natural disaster, give weight to a giant footstep, add depth to a booming vocalisation and add seismic waves to a punch or explosion. Unfortunately, it can also rattle objects in your listening room causing unwanted sounds. Sub frequencies can also cause phase or cancellation issues in poorly aligned rooms and can even sound different from room to room.

As the subwoofer is infamously difficult to predict or control, the general rule in 2010 seems to be caution and discretion. Many mixers and supervising sound editors have argued that the front left and right channels should communicate the bulk of the low frequencies as these channels can be more easily predicted from room to room. Another argument for sub conservatism is that when the 5.1 is folded down to a stereo track, any sub exclusive content that may be relevant to the narrative, will be greatly diminished. To prevent this, many mixers use sub-harmonic synthesizers to generate low frequencies from the main channels into the sub. Others edit separate tracks designed specifically for the subwoofer to re-enforce transients and rumble in the main channels.
And of course there will always be more enthusiastic bass-junkies who prefer to use a combination of both processes.

**Sound Effects Recording Techniques:**

With the luxury of multi-channel portable recording rigs at their disposal, many sound designers are pushing and experimenting with the placement and combination of different microphones to record a single sound effect. It is with deep regret that none of the leading specialist Sound Effects Recordists where available for an interview on my trip as I am sure they would have had a lot of pearls of wisdom to share for this segment.

However, of the interviewees I spoke with, Supervising Sound Editors Erik Aadahl, Richard King, and Elliot Koretz were the most insightful on this topic. Aadahl spoke about how he and Ethan Van der Ryn recently set up an array of microphones to record the ‘full travel’ of their sound making props. These multi-mic recordings were then edited and mixed together to create longer sounds with more details to manipulate to picture. Aadahl continued to explain that he also prefers to record his props being handled gently to capture all of the subtleties that are often lost in fast loud transient sounds. This way, the sounds can be compressed and manipulated later to make them sound larger – whilst still retaining and benefiting from the textures and details you get when you handle props softly.

To get the gun sounds for *Inception* (2010), Richard King set up multiple mics around a firing of weapons in a field. By aligning the transients of all of the separate recordings in post, he was able to create new sounds that could never have heard from any one perspective. With this kind of control over the balance and tones of a sound, he can shift our focus to the emotional character of those sounds rather than just adhering to its physical perspective.

Elliot Koretz spoke about concealing microphones in clothing or props to record crowd background sounds in busy public places such as train stations and malls. The technique takes advantage of the latest advancements in portable recording technology to get real world sounds without drawing attention to himself or influencing the sounds of the people around him by walking around with big, obvious recording rigs.

**High Resolution Sampling Rates and Extended Frequency Microphones:**

The manipulation of a sound recording’s pitch and speed is a time-honoured technique used by sound artists, music composers, music producers and film sound engineers.

Whilst this technique has survived the film industry’s digital takeover, it has been met with a number of problems. The great limitation with digital speed and pitch manipulation is that over down-pitching introduces unwanted digital artefacts. Whilst this shortcoming has been beneficial to sound designers who have created robot vocalisations or montages of data flow (as in the data sequences in *The Matrix* (1999)), it is a real nuisance for creating organic sounding vocalisations, atmospheres and sound effects.

A further limitation of this practice in general has been the limited frequency range of microphones. Microphones are typically designed to reproduce roughly the same hearing range as humans. Whilst fidelity in this frequency range is vital for the majority of audio applications, it has restricted the potential to slow or pitch sounds down. When a sound is slowed down, the frequency range of a recording shifts down the spectrum. This has meant that the highest frequency we can play with is often at about the 20 or 22 Khz mark.
These limitations are currently being scrutinised by a number of innovative software, hardware and microphone developers (and the stupendously talented team of sound makers at Park Road Post in Wellington).

Just as digital camera resolutions have increased rapidly in the past decade, so has the sampling resolution of audio recorders and DAWs. It is now possible (and becoming more accessible) to record sounds at sampling rates of up to 192khz. This very high sampling rate allows a greater rate of pitch control for much the same reason higher resolution digital photographs can be magnified before digital pixels become obvious and start to distort the clarity of the image. This has given pitch pirates greater flexibility to down-pitch sounds for organic applications to a greater extent before audible artefacts are introduced.

A new generation of extended frequency microphones will also undoubtedly gain in popularity amongst leading sound designers, Foley artists and sound effects recordists. Coupled with high resolution recording equipment and DAWs, recordings using these microphones capture super-high frequencies which can be pitched down into our hearing range. Arguably the most exciting thing about this technology is new high pitch sounds await to be discovered and manipulated.

As this technology gains in popularity amongst the elite sound community, I imagine that like with all market opportunities, these types of microphones will become more accessible to broader markets in the very near future.

**Specificity and Minimalist Sound Aesthetic:**

Specificity, or the focusing of our hearing on only the most emotionally relevant sound effects, dialogue lines or musical phrases, is starting to dominate the overall aesthetic of the modern blockbuster sound track. This approach to film sound is found in a lot of recent work by Glenn Freemantle, Ethan Van der Ryn, Craig Henighan, Derek Vanderhorst, Mark Stoeckinger, Karen Baker Landers, Per Hallberg, Eric Norris, Dan O’Connell and Randy Thom.

Proponents of this minimal approach argue that the specific selection of sounds and its accurate placement increases the focus, punctuation, emotional accuracy and above all, clarity of the track. These adjectives are particularly paramount to successfully guiding audiences through long and eventful action sequences.

This direction towards specificity, in both the number and selection of sounds used in a particular scene or event stems from the fact that sound has an uncanny ability to direct the audience’s eyes on the screen and/or place the audience within the character’s emotional subjective perception of sound. It is popularly agreed, and indeed as Walter Murch once famously argued that audiences are only capable of processing 2-3 sounds at a time before the focal hearing point is lost. One sound designer, who will remain unnamed, went further to say that “men can only hear one sound at a time where as women are possibly capable of processing four or more”.

As DAWs continue to deliver an ever-growing number of tracks, there has been a tendency in the sound community to max-out sessions with layer upon layer of sounds to track even the most eventless of movements on the screen “just in case the mixer needs it”. As mixing schedules continue to be reduced, what most mixers actually want is the sound editor to do exactly what their job title suggests and make ‘edit’ decisions. Other than the complete lack of focus in these often-convoluted sessions, a number of issues arise in this practise. First and foremost, over layering sounds clutters the frequency range which muddying up the mix in much the same way you can
muddy paint colours if you mix enough of them together. And as discussed earlier in the paper, too many tracks played at the same time can also result in summing issues in the DAW’s final output.

**Intentional Distortion:**

In a reaction against the film sound industry’s, at times obsessive, pursuit for fidelity, clarity and the reduction of noise, a new wave of film sound tracks have been pushing the status quo. *Death Proof* (2007), *Cloverfield* (2008), *Fantastic Mr Fox* (2009) and *Book of Eli* (2010) have all in recent years embraced distortion in one way or another to brilliant effect.

Will Files’s sound design for *Cloverfield* responded to the first person camcorder view with a similar (albeit highly stylized) sonic aesthetic that one would expect from a domestic video camera microphone; with all of the usual compression pumping, dialogue panning and distortion clipping we have all come to associate with that medium. Whilst aesthetically thrashy, this track was masterfully crafted with attention given to make full use of the frequency response, dynamic range and 5.1 pan spectrum of contemporary cinema. In *Book of Eli*, Eric Norris and his team similarly went for a thrashy aesthetic as it complimented the distortions in Atticus Ross’s music score seamlessly. In *Death Proof*, Wylie Statesman’s team replicated the sonic imperfections of an old 70’s exploitation film print, complete with ‘boxy’ sound effects, clicks, pops and tape hiss in pursuit of what is being referred to as an ‘analogue sound’.

The team from *Fantastic Mr Fox* also pursued an overall ‘analogue sound’; without the pops and clicks. Increasingly, an *analogue sound* has come to be known as a narrower panned, less dynamic mix with a warmer sound. This warmth is typically achieved by manipulating the highest and lowest frequencies to prevent the track from sounding too ‘sparkly’ or ‘bottom heavy’. Whilst this film did not use any distortion filters per se, the frequency limitations placed on the master track provided an overall distortion of the potential digital frequency range for a deliberate aesthetic effect.

The gritty sound design for *Punch Drunk Love* (2002) is a popularly cited film for inspiring this trend. Although this sound department on this project benefitted from an all digital pipeline from recording to mixing, the power and aggression of the famous bathroom scene was emphasised more in the distortion of the signal and rather than simply from the volume of the sound pressure level. Gary Rydstrom said that he had added a lot of Foley and sound effects to replace the location sound with a clean modern dynamic sound, but PT Anderson kept referring back to the original mono distorted track until it was the only one that got used. From a creative perspective, this decision was innovative as it successfully communicated the emotional intent of the scene without distracting the audience. This experience also proved again that there is no right or wrong way to do things. A mono track playing dead centre with a well-designed reverb was all that was needed to resolve this shot. This may have been a counterintuitive decision but it is true and effective.

For generations, the modern film audience have happily subjected themselves to distorted drums and guitars in their leisure listening time. It is with great excitement and creative possibility that distortion has established itself as an invited guest in the film sound toolkit.
Cross-referencing Film Sound for Portable Exhibition:

In a time when cinemas are stumbling to find new ways to fill seats in theatres, portable exhibition is on the rapid rise. Laptops, aeroplanes, telephones and other personal devises account for an unquantifiable\(^5\) majority of the film watching community.

This has caused some amount of curiosity and concern in the sound world. As audio technology continues to expand in dynamic and frequency range, speaker configuration and fidelity, more audiences are watching films with greatly reduced sound quality from one inch speakers and dirty earphones.

As discussed earlier in this paper, several mixes are generally made for every film. This is necessary as the size of the speakers, distance from the listener and shape and treatment of the room all affect the final sound. Alas what works in a big cinema with horn speakers may not work in a living room with domestic speakers. There is however some resistance to create additional mixes to accommodate the other more portable modes of listening. As more lines of dialogue are lost on aeroplanes and more sound effects are gutted by computer speakers, many mixers are now considering the benefits of a one-inch speaker mix.

On the topic of aeroplane sound, does anybody know why most airlines don’t allow people to plug their own headphones into the onboard entertainment unit? Its not like anybody would want to steel those hopeless headphones they provide. Don’t most travelling people carry their own headphones with them anyway? Why are we being coerced into bad film-sound by the airline industry?

Whilst there is enthusiasm in the industry to capitalise on small speaker mixes, sound people have a long road ahead of them before convincing production executives that it is worth the extra investment. Furthermore, there is a lot of pride and hesitancy within the film sound community about the idea of reducing the quality of their work to accommodate the portable market. However, the fact remains that sound is being butchered by these sub-standards and that an additional one-inch speaker mix may give us the opportunity to bring better sound to more people – particularly on planes and in the 3rd World.

\(^5\) It is unquantifiable because of widespread illegal file sharing and the portability of storage and viewing devises. In the current climate of film piracy, the exhibition of films is no longer physically restricted to traditional distribution regions.
Recommendations:

It is a pre-requisite of the Winston Churchill Fellowship report that I make recommendations to the local Australian film sound industry based on the lessons I learned abroad. However, after visiting the film sound studios in Melbourne, Sydney and Adelaide and speaking with many of Australia’s best and brightest, I am happy to report that Australia has world-class sound facilities and talent.

By and large, we are using the same tools and share similar work pipelines and creative philosophies as our overseas cousins. Some Australian mix facilities are now also looking to upgrade to 7.1 as local cinemas embrace this new format. Furthermore, our crafts people are well read, some are even published and many have received or have been nominated for many top international prizes including Oscar, BAFTA, Emmy, MPSE and CAS Awards.

The main difference, which is separating the Australian film sound industry to the industries I visited abroad, is that Australian sound departments are starved for reasonable production schedules and budgets and, horrifyingly, we are starting to watch giants fall. For example, earlier this year legendary Sydney based mixing facility Audio Loc closed its doors and went virtual.

Other than the suggestions offered in the main text of this report, my recommendation is not to the sound industry at all. Rather I would like to make a recommendation to Screen Australia and all of the other financing bodies, producers and post-production supervisors who are squeezing the sound industry to the point of suffocation in Australia. Please stop green-lighting feature film productions that budget punitively low amounts for sound. ‘Guesstimations’ are not as commercially viable as realistic quotes given by sound practitioners and these should be cross-referenced against production handbooks and should factor inflation, conforming and delivery costs before they are approved. The facilities are simply too expensive to keep running at the current rates and it takes many highly skilled people to work long months to create awesome sound. (Please refer to Page 7 for a breakdown of practitioners who need to get paid to deliver a world-class product)

In Hollywood I heard time and time again about the ‘golden triangle rule’: good, fast and cheap – only two are possible. With more time to experiment and play, Australian sound people will be able to really show their stripes and maybe even show other countries a thing or two. With less time we need to employ more skilled people. This is, of course not cheap. With no or little money, there is not a hell of a lot that can be done outside of cleaning the tracks a little and wanting to change your name in the credits.

Highly respected Re-recording Mixer Phil Heywood offered a solution to this crisis that is facing the Australian film sound industry. He argued that Australian film financing bodies should be focusing its efforts on financing 10 well-made feature films with international appeal rather than spreading itself across 30 or more films that no one wants to see. He argued that producing fewer films with higher budgets will employ more people for longer. Reasonable budgets also create the opportunity for studios to keep up to date with technological developments as well as affording them to give newcomers the chance to learn in a proper studio environment from seasoned professionals – rather than on their home computers with printed tutorials.

Flagging these arguments in this report is not to oppose the low budget independent film world. Investment in short films is crucial for fostering new talent and to continue our outstanding reputation abroad. Recently two short film projects I sound designed, The Lost Thing (2010) and Deeper Than Yesterday (2010), have dominated the international film festival circuit, winning numerous prizes at top festivals such as Cannes, Annecy, Chicago and Sundance. The Lost Thing even picked up an academy award for ‘Best Animated Short Film’. This international attention is
beneficial to our cultural identity as a filmmaking nation and it will surely launch the careers of the directors and producers. This is beneficial to our industry as it will put them in contact with overseas markets, which, as in the cases of Fred Schepisi, Baz Luhrmann and Peter Miller, has provided work for a larger cross section of our own local screen sound community.

However, for low budget films below the five million dollar mark, if the producer is worth their title and the script is rock solid, then finance can always be found in the private sector in Australia or abroad. Government funding to these films does little for the crisis facing the screen sound industry. These productions are infamous with making ‘deals’ that rarely come to fruition and sometimes don’t pay at all – even if the project has gained funding and contracts have been signed.

It is also simply not economically feasible to employ new sound people at the rate that our film schools are producing them. If less feature films are to be produced and these are to become profitable, this money can be re-invested into more projects in the future to give even more talented sound (and other film) professionals the opportunity to contribute to their wonderful country’s cultural heritage.

**Dear foreign productions:** please read this as an open invitation to use Australian sound facilities and talent. With government tax offsets in place, Australia has a talented and hungry sound community that can take on even the most creatively or technically demanding projects.