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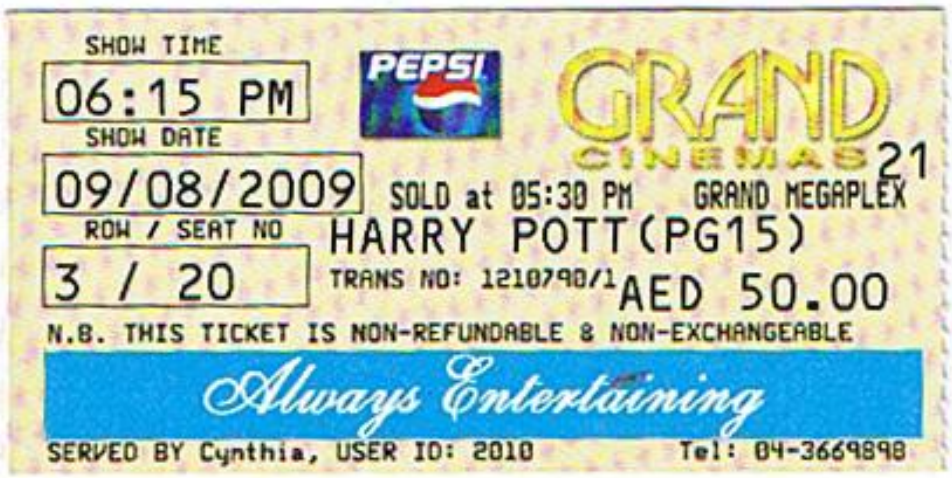
SHOW TIME
06:15 PM
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09/08/2009
ROW / SEAT NO
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PEPSI
GRAND CINEMAS 21
SOLD at 05:30 PM GRAND MEGAPLEX
HARRY POTT(PG15)
TRANS NO: 1210790/1 AED 50.00
N.B. THIS TICKET IS NON-REFUNDABLE & NON-EXCHANGEABLE
Always Entertaining
SERVED BY Cynthia, USER ID: 2010 Tel: 04-3669898


SHOW TIME
03:00 PM
SHOW DATE
09/08/2009
ROW / SEAT NO
4 / 12
PEPSI
GRAND CINEMAS 4
SOLD at 02:05 PM Grand Festival
G-FORCE 3D(G)
TRANS NO: 791318/1 AED 40.00
N.B. THIS TICKET IS NON-REFUNDABLE & NON-EXCHANGEABLE
Always Entertaining
SERVED BY Chester, USER ID: 2010 Tel: 04-2328328

2D to 3D Converted Movies

Good Enough?

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Disclaimer:

The author (myself) has been involved in Stereoscopic 3D technology and visualization for over 11 years, and has worked with almost all of the technology, methodology and many of the processes involved in creation, and display of stereoscopic 3D content and hardware.

This article is only intended as my point of view on the subject of 2D to 3D conversions being done for commercial feature films as of this writing, and is not intended to be an authoritative guide or authority on the subject.

No accusations as such are directed specifically toward any Feature Film, Film Studio, Production house, 3D conversion studio and / or the producers and owners of 3D films in general and of the two example films used as case studies in this document.

This document is meant as an informative guide only, for movie going audiences, to educate them on some of the differences in watching a movie that has been shot and produced in "real 3d" or "stereoscopically" shot with dual cameras i.e. from two points of view mimicking human vision, versus a "normal" film that has been later converted to "3D".

The point being to bring to their general notice the differences that are to be taken into consideration between real "stereoscopic 3d" capture of scenarios (live scenery, actors and CG) and that of "converted 3d" and the loss of nuances and hence the ultimate feeling of immersion when films are ***not*** made using stereoscopic 3D (physical or CG) cameras.

Film producers, Cinematographers, Directors and Directors of Photography may also benefit from reading this document and then learning some of the Pros and Cons of shooting their next feature film with a stereoscopic camera rig – or shooting it with regular cameras and converting it to "3D" later.

What the Audiences need to know is that although movies are a mix of live actors, animation, environment special effects and such… it is becoming increasingly hard to define what is "real" in today's movies.

However, in the quest for "realism" and true audience immersion which today's 3D movies are promising, I feel that it is a step backward to not actually capture the real world with tools that are ***readily*** available, simply because some established film makers do not want to, and there are 'conversion houses' out there that promote the use of conversion as a superior form of presenting 3D.

Proclaiming that a 3D movie should be shot in 2D is an oxymoron in itself, and then further proclaiming that it is a superior methodology over shooting with real 3D cameras, while not revealing the many caveats of the process to Directors and film makers is what prompted the writing of this document.

In the end… to each his own, and a movie when done badly, will fail, whether converted or not. However, the visual eye-candy and realism that a true stereoscopic 3D camera can capture will save an otherwise disastrous movie to an extent at least!

- *Clyde DeSouza.*

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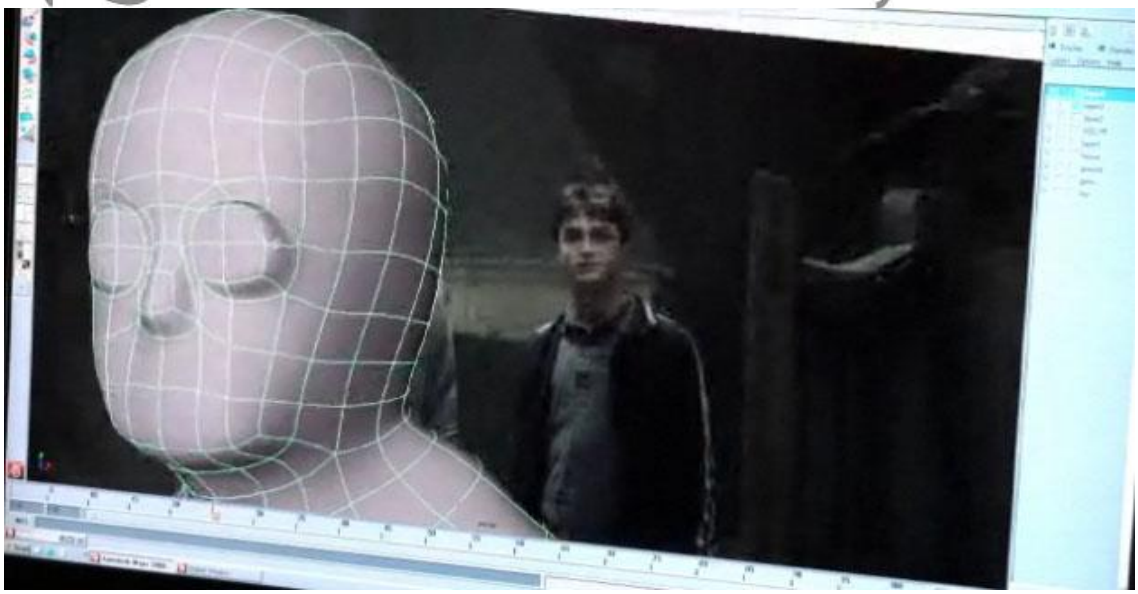

Introduction:

There has been a revival of 3D films recently. Hollywood and other international film industries have realized that if they are to bring people back into the Cinemas, they needed something new and worthwhile to draw audiences back.

Home Cinema systems with flat screen TV's, High Definition (HD) video playback and delivery coupled with surround sound home theatre systems were taking over and as a result Cinemas were losing their decades old glory and revenue.

Much worse, with home theatres, the issue of movie piracy arose and it still is a very real and serious concern.

So to combat all this, it has been argued that 3D Cinema will be the savior.
After all 3D is best enjoyed at larger than life size, as is evident from watching a 3D movie in the cinema versus on a computer screen or much worse, a portable device such as a PDA sized display (in anaglyph or red-blue glasses 3D)

However, 3D is not new, and has been around since the time of Black and White films. It made a come-back several times before, but was dismissed time and again as a fad. What Hollywood is counting on this time around is that technology has matured with Digital, HD and more advanced camera capture, editing and presentation systems.

Gone is the "poke them in the eye" 3D gimmicks, and today's 3D films are aiming for Realism, Audience Immersion, and a head ache free 3D viewing experience.

The last sentence above – is also the reason for the rest of this document!

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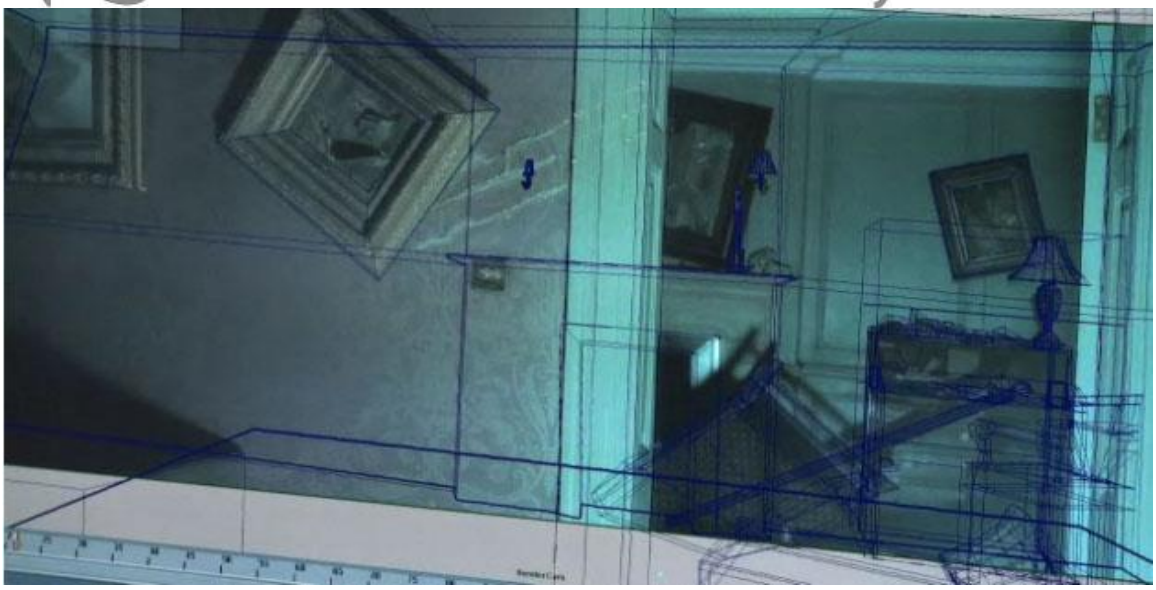

2D to 3D conversion versus Original 3D

Explaining in detail how 3D Feature Films are shot and created is beyond the scope of and nor is it intended to be the purpose of this document. We intend to discuss an overview of the differences between a 3D movie that has been originally shot with a stereoscopic 3D camera and one that has been shot with a regular camera and converted later.

The question being: Should it matter to the Audiences? Also, is it better to convert a normal movie to 3D or Shoot it in 3D in the first place?

The author leans to the point of having a bias toward shooting with real (or CG) stereoscopic cameras. 2D to 3D conversion studios that service Hollywood argue that it's better to shoot a film as regular 2D and then 'convert' it to 3D later.

So – Why Conversion versus Stereoscopic 3D capture in the first place?
The answer to this is that many Cinematographers are not familiar with stereoscopic camera systems. They also say that it is more unwieldy to handle a stereoscopic 3D camera rig, takes at least double the time to process and is more complicated to do special effects and compositing.

Added to this – 2D to 3D conversion studios readily promote conversions as being Superior to shooting in 3D and Cinematographer should shoot all 3D movies ***irrespective of genre***, in 2D and convert later. They also claim that depth budget in the movie can be controlled more efficiently this way.

Meanwhile audiences often pay a premium price to view a 3D film - a film, which may have resorted to all these short cuts to ease the time-to-market deadline.

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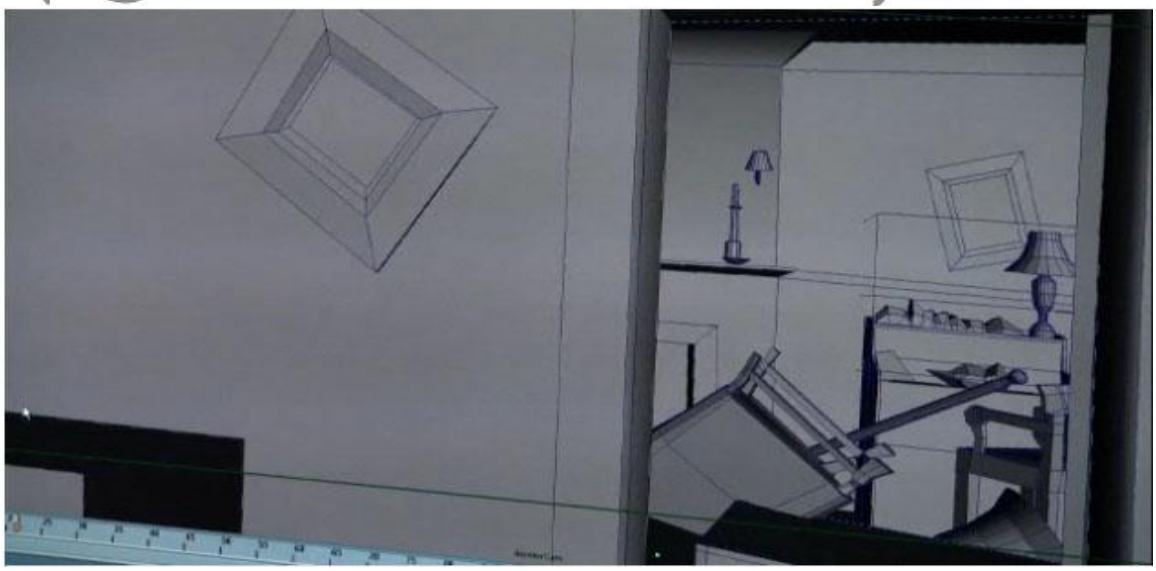

2D to 3D – The Conversion Process:

The pictures above the heading on this page and on the previous page are still image grabs from www.youtube.com of a short video, showing some of the methods used in converting a regular 2D movie to 3D.

2D to 3D conversion houses or Studios, employ their own trade secrets, and customized software and processes, which in their own merit, worth mentioning – are quite advanced. However, common to almost all of them are – off the shelf "object tracking" software, rotoscopy software, animators and one or more Human "3D Depth" supervisors.

Usually a scene in a movie is analyzed for different 'cues' that can be used to advantage to make the conversion easier, more robust and of course more real.

The easiest one being scenes with lots of horizontal linear motion such as the view from a train, and things moving from left to right of the screen or vice versa: - These scenes are easiest to convert, based on the ***PULFRICH*** principles of stereoscopy.

But in the examples above, objects and actors are outlined and '3d' models are created, much like how animators create 3D models in computer graphics (CG) software. The 2D video is then used as a "texture" and draped on these 3D models created, the view is then shifted and missing information if any, ***added by a human operator!***

This is done on a frame by frame basis for the entire duration of the film. For example typically in a 24 fps (frames per second) movie, 24 different "frames" of video are analyzed, traced by the operator /computer and textured to create the missing second eye view.

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In a stereoscopic 3D camera system, this second eye view is captured during the shooting stage in a straightforward manner (in a CG movie a virtual stereoscopic camera is used to render the scene)

In 2D to 3D conversion, (ideally) every object has to be tracked and "converted" to thus produce the second eye's view. You can imagine how complex this can get depending on the scene. Various techniques are used, such as hand traced depth-maps, software for semi-automated tracking of objects after they are outline by a human operator and also geometric mapping and texturing of video.

Don't forget that this time around the audiences are going back to the Cinemas to see "realistic" 3D movies, not gimmicky out-of-screen 3D effects. So the effort needs to be put in to make sure that a scene shot in 2D is carefully re-created for full 3D immersion.

Before we get into just two of the recent Hollywood films that use 2D to 3D conversion, as an educational case study, let's look at some everyday scenes that have to be converted for that 'realism' and 'immersion' that is expected in a 3D film.

- An outdoor summer scene, grass on the lawn , leaves blowing in the wind, people waking in the park, a woman's hair blowing in the wind.
- A close-up of an intense scene in a movie, where beads of sweat are pouring down the forehead of the actor, setting the mood for the scene
- Person peering out through a glass window
- A cobble stone road stretching into the distance
- Man holding a glass of wine and admiring the liquid inside
- Choppy sea or a calm lake
- A shiny new sports car with the sun gleaming off the sunroof
- Shot of a person inside a car with the window half rolled down

The reason to mention all these ***common*** movie scenes is that these are normally what you can expect in any movie. The more specific reason for mentioning these scenes is that as of today, it is extremely difficult to convert such scenes realistically. Try automatically or manually tracking and giving correct depth to every blade of grass that is within focus or in the depth or field of the camera, while also every pebble on an asphalt road.
Shooting such a scene with a stereoscopic camera… is a no brainer and captures the full richness of the scene that your ***eyes and brain*** then fuse to ***immerse*** you in a 3D movie.

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Why my Cinematic 3D Experience was lost in these movies:

At the onset I have to say – and this might defeat the purpose of this document, that in BOTH the movies, they were pretty good conversions!

With that out of the way, let me explain in more detail, the reason they seem to work is that in the first movie, G-Force, it has a combination of true stereoscopic CG (rendered correctly with stereoscopic cameras) and most importantly the movie was extremely fast paced with little dwell time on any scene that was 'converted'.

In Harry Potter, there was only 13 minutes at the start of the movie converted, and the scenes were of a gloomy gray and dark world, not the richness that can be expected of scenes in every movie.

So, to the untrained eye, the converted movies would be great. To me it was good.
I am of course being objective and appreciative of the conversion skills.

However, yes there would be a however, the next few pages show what is missing when such movies are converted instead of being shot with a real stereoscopic camera in the first place.

Directors and Film producers need to know that producing a realistic 3D movie goes much further than simply 'converting' objects of interest in the story. Even these converted objects of interest are not without major flaws as we will see…

> ***In a 3D movie, by its very nature, it invites the viewer to roam around the rich visual vista. The eyes and brain like to take in the surroundings, even while paying attention to what the director wants them to see and hear.***

In capturing a scene in 3D it has been my point of view, that you either use extreme focus (the subject is in sharp focus and the background completely defocused) or full wide focus, so as not to cause discomfort in viewers who may be trying to 'focus' on background objects or imagery of interest.

While 2D to 3D conversions allow you to creatively set your point of focus this way, they also fail miserably, if all objects that are in the field of view are not 'converted'.

The end result is akin to a Stage Play, where for example the props are just wall paper like posters of interiors of a house stuck to a flat board and devoid of actual 'edge relief' while people and a few tables and chairs have full 3dimensional relief.

Conversion Observations:

These are the reasons that would detract from me going to the Cinema to see a converted 3D movie. After being made aware of these limitations, it would be interesting to note audience thoughts on the subject when they see it in other converted films – Films of other genres, where there is more dwell time on scenes.

I will try my best to remember what I saw as I did not have the luxury to Stop and Pause the movies at the Cinema! These are screen grabs from sources such as Youtube.com and after Google searching for online streaming videos. The screen grabs are obviously from 2D versions of the movies and used for illustrative and educational purposes only.

If they violate any copyrights, please do inform me and I will remove them and amend the document.

From G-Force:

In this scene, the trees look like cutouts, even as the camera nears closer to the ground. There is no ‘relief’ of the pebbles on the ground.

As this is a CG mixed with live action film, I still have trouble from knowing for sure if the ‘set’ is a CG replica using inherent render shortcuts, or indeed the live set has been ‘converted’.

Again, in this scene and also in a similar scene where the dogs chase the hamsters, the entire surface of the ground is "flat". This leads me to believe that it is a hand made 'perspective depth map' that has been applied to the ground.

If it was shot with a true stereoscopic 3D camera, you would see the rich detail of all the pebbles on the ground. It would be as if you were kneeling down and looking at a pebbled pathway.

This is what 'realism' and 'immersion' in a correctly shot 3D movie should feel like. In a 2D to 3D conversion, it's time consuming (and expensive) to create 3d geometry for every pebble there. So the entire scene is "faked".

Now however, it may also be possible that in this scene the pebbled pathway was created in CG and was just a 'texture map' of stones. This gets a little complex to explain in full detail here…

But suffice to say, if this is a live action set that has been converted, it was non realistic as the stones were 'flat' The hamsters were rendered in true stereoscopic 3d (CG) cameras so they retain their correct 3D perspective.

Conversion studios argue that its more effort to composite stereoscopically – Well there are industry standard tools for doing this, software like NUKE, After-Effects, and hardware such as Quantel Pablo, SCRATCH and others edit in stereoscopic 3D.

If audiences are paying to enjoy a CINEMATIC 3D experience, corners should not be cut in producing it!

The edges on the Truck have not been properly 'converted'. The converters paid lots of attention to converting the main character and what they assumed would be the focus of attention of the viewers in this scene.

I was looking at the Pest removal company decal and my vision went westward from there, and while in this 2D screen grab the indented door looks real, in stereoscopic 3D it's a whole different thing. It looks like a Wall paper of this 2d image stuck onto a flat box.

There are many more scenes, where I do not have visuals for, but will try and recollect from memory:

- Scene in FBI agents car, the window is half rolled down and the agents tie and suit looks 'glued' to the glass window – reason, you can't fake transparent material convincingly
- FBI agent's car looking at them from the front. The back of the car is not converted resulting in a fake unrealistic view of the back of the car.
- The outside yellow brick house where the FBI interrogate the main human character. No realistic conversion of the house, it looks flat.
- Many of the scenes with the cars, the main cars are 'tracked' and converted, the rest of the scene is not.

Now while this does not seem to matter to the average person, it is worth noting that should this be in a regular movie and is not part of a car chase, how long would it take to convert such scenes?

And more importantly, can Conversion houses seriously justify telling Directors to shoot ONLY with a 2D camera? What happens to the rest of the scene?

In G-Force to give credit however, ALL the human characters had very good conversion.

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Harry Potter (3D segment)

In this scene, it looks like Harry's eyes are glued to the front of his glasses. Again, this is one of the shortcomings of the 2D to 3D conversion process.

Conversion studios won't tell this to Directors when they recommend that all 3D movies be shot in 2D and converted later.

If they have told Directors, and the decision is still to go ahead, in that case then the Directors are guilty of cutting corners to meet budget and time deadlines and in the worst case scenario, of shoddy production just to push the film out to market. It is akin to using corny 2D special effects in a movie. Everyone strives for realism, and this scene may show otherwise.

The window is completely flat and realism of dirt and grime and mist is missing, that would have been captured realistically had it been shot with a 3D camera.

The scene looks like a flat card-board cutout that has been offset as different “layers” in 3D space.

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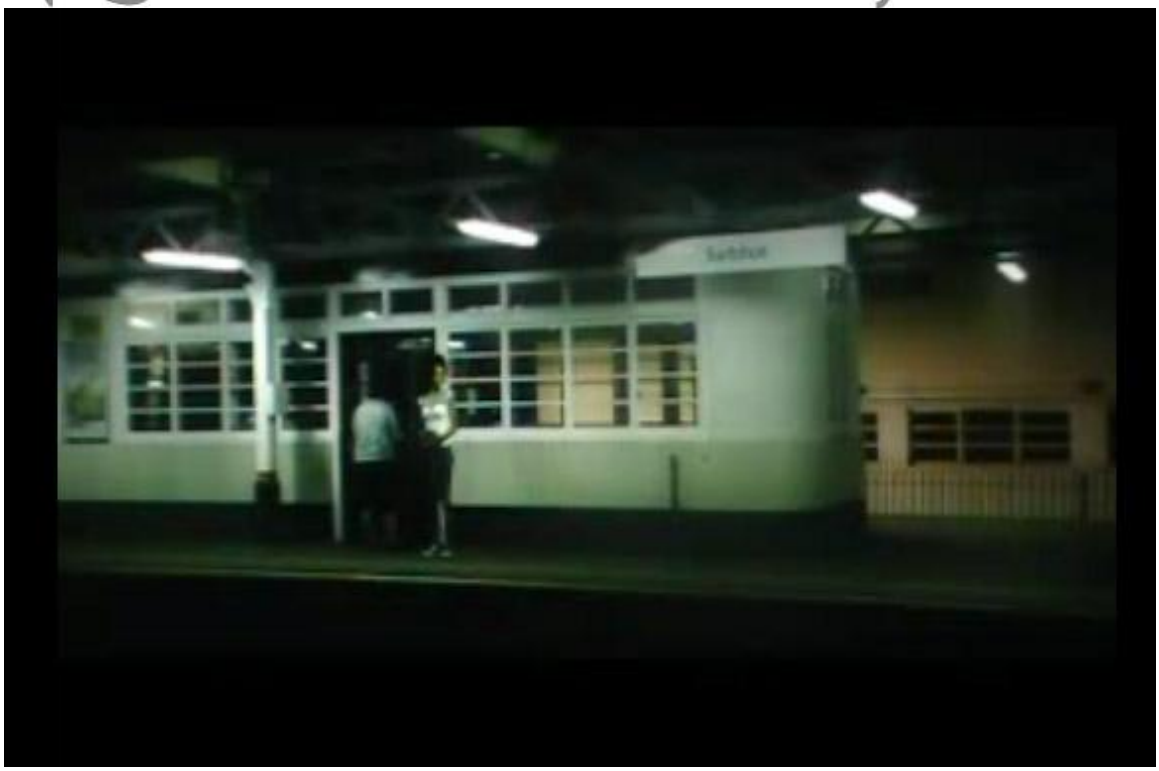
The scene above has objects missing depth, for example the frames on the wall look like a flat wall paper in 3D. In this 2D scene the suggestion is there that these are real 3D objects, in 3D these ‘depth cues’ are exposed if not shot with true 3D camera viewpoints.

The premise in this conversion would be that the audience is “supposed” to be looking at the main characters and not the background. This is not always the case – What if despite the Directors best effort the dialog is not interesting? In a real 3D scene at least the audience can enjoy the eye candy and rich visuals of the surroundings.

Even in the scene above and in similar scenes, the very “rough” geometric models of the characters makes the beard look like an extruded cylinder with the video overlaid as a texture.

In this scene I remember, not all objects were modeled, thereby the scene looks unrealistic.

When I go to see a 3D movie in a cinema, I want that larger than life experience, and be immersed in a real setting. Not some person's version of what should look real and what should not!



In this scene, the girl has been properly converted; the detailing on the buildings behind has not, giving them a boxy flat wallpaper look.

There are many more examples, for instance Harry Potter, while being admittedly skinny, how do we know what his real profile looks like? He looks like an extruded cardboard box to me in the scenes.

In G-force, there were some scenes where the convertors perhaps "forgot" to or just did not bother to convert the main character properly. One such scene is when he is sleeping on his sofa bed and the fly approaches his near his laptop.

The detailing on his clothes look flattened out. This is worth re-checking as I mentioned, I do not have access to the 3D version of the film to scrutinize.

Again let me explain more on this "scrutiny"…

It is argued that people will not be going to see a 3D movie specifically to try to shoot holes in the process if they somehow learn that it's a converted 2D to 3D movie.

This is entirely true. But as a Film Producer, is it worth the effort to expose these kinds of flaws? When the entire scene can be captured impeccably with the use of a stereoscopic 3D camera? And an educated camera person and DOP.

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3D cameras are not cumbersome, Depth can be monitored live, and any experienced Stereographer can do a fantastic job assisting a DOP or Director for Depth Grading, stereo violations that result in Audience nausea and discomfort, Shot Framing and most importantly the "immersion" that a 3D movie is supposed to provide this time around.

Some noteworthy equipment for easy, true Stereoscopic 3D Movie making:

- THE SIP 2100 – From 3Ality / Quantel. This box is worth its weight in gold for live 3D shooting and for 3D Cinematography.
- PABLO and SCRATCH stereoscopic color grading and edit suites
- NUKE 3D Compositing software
- DEPTH Q – Portable 3D projection system for viewing dailies in 3D
- CHRISTIE 3D projectors
- RED ONE cameras to build a 3D rig
- SI2K cameras.
- http://www.slideshare.net/clydd/location-previz-in-stereo-3d

The next time you go to see a 3D movie, it is hoped that after reading this document you may be aware of the differences between one that has been carefully scripted, shot, edited and presented while staying in the stereoscopic 3D "domain" from start to finish… and one that has cut corners either to save time, budgets and ease (debatable) creative work-flow.

In my opinion, 2D to 3D conversions is a handy tool for some scenes, such as stunts where fast paced action needs to be taken into account, but for 2D Conversion studios and Hollywood to accept the notion that a 3D movie should be shot in 2D and converted later in post – It's just not real enough to me.

I have not got into the claims that conversion studios make that conversions produce headache free viewing. This is somewhat a myth, as movies shot in 2D in the first place will be 'cut' for 2D which does not always work well in 3D.

For now,
Let the audiences decide their expectations from 3D movie realism I guess!