

The Breakthrough of 3D in Cinemas

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Abstract

This paper searches the roots of 3D film in cinemas and explores the future of 3D film in areas such as technology, budget costs, and the marketplace. The short history of 3D movies will examine how the technology was used several decades ago compared to the new advancements in 3D technology. The research shows that the budget costs for 3D movies are increasing due to the new technological developments in the industry. This paper also discusses the current marketplace for 3D movies and its place for theatre production. Some research also discusses the future advancements for 3D not only for cinema usage, but for home entertainment as well.

The evolution of 3D technology dates back to the early 1900s, when the first presentation of a 3D film did not have a paying audience. This first event was described in the 1993 edition *Guinness Book of World Records*. It took place at the Astor Theatre in New York on June 10, 1915. This showing consisted of three one-reelers, including rural scenery in the U.S., a number of scenes from *Jim, The Penman* with John Mason and Marie Doro, and the last reeler consisting of a travelog of Niagra Falls. This showing used an anaglyphic 3D process developed by Edwin S. Porter and W.E. Waddell. The process involved the wearing of red and green spectacles, which create a single image from twin motion picture images photographed 2 ½ inches apart (“Important 3D ‘firsts’”, n.d.). This experimental process failed due to the shuttered images which distracted viewers from the plot of the show.

A few years later, on September 27, 1922, the first 3D feature film was released in Los Angeles at the Ambassador Hotel Theatre. *Power of Love* was produced by Perfect Pictures and also used an anaglyphic process which was developed by Harry K. Fairall (“Important 3D ‘firsts’”, n.d.). Yet it was *Bwana Devil* that gave 3D the push that it needed to succeed in Hollywood. This successful 3D film premiered at Paramount Theatres in both Hollywood and Los Angeles on November 26, 1952. This film success was due to a new 3D advancement of dual strip formatting and the use of interlocked projectors and polarizing filters (Hayes, 2009). A few other movies which audiences were drawn to the theatres for the 3D experience were *House of Wax*, *Creature From the Black Lagoon*, *Man in the Dark*, and *Kiss Me Kate* (“History of 3d”, n.d.). Yet due to the low budget costs for 3D production, the fad was short lived.

During the early 1980s, when the invention of the VCR came into play, box office revenues were decreasing rapidly and more audiences stayed at home to rent movies to watch whenever they chose to. This resulted in a short comeback for stereoscopic cinema, and 3D masterpieces such as *Friday the 13<sup>th</sup>* and *Jaws* in 3D became the popular movies to interest audiences in going out to theatres (“History of 3D, n.d.). Although some may consider 3D technology as a fad which passes in and out of cinema history, the ever changing technology of 3D film production is creating another stimulation universe for audiences everywhere.

Up until a year ago, the 3D technology consisted of using two cameras which would capture left eye and right eye images. Blogger Michael Smith (2010) explores a little further into this topic in Engineering Education “Today in History” Blog: First major 3d movie;

These movies have been considered more gimmicks than an improvement in quality of the viewing experience. The movies are hard to create and the infrastructure for viewing is primitive, but that may change with new digital algorithms and viewing media. NASA is exploring using 3D images and films to better project complex phenomena. For example, NASA’s Solar Terrestrial Relations Observatory (STEREO) satellites provided the first three-dimensional images of the sun. Using 3D, scientists are reported to be able to see structures in the sun’s atmosphere in three dimensions in a way that improves understanding of solar physics and space weather forecasting.

To survive the world of entertainment in cinema, 3D technology must be on top of its game and always pushing the envelope for new developments and new ideas to create a better 3D experience. Due to a recent increase in equipment manufacturers, such as Binocle, Technik, and Element Technica, 3D production capacity is expanding with rapid refinements. These manufacturers have also developed 3D camera rigs which had 3D capabilities in postproduction systems, and also in current development of a new line of 3D products which will aim to make 3D viable (Giardina, 2009).

Boxoffices heated up when the release of James Cameron's *Avatar* hit theatres last year, and the meaning of 3D changed the way audiences watched movies and shaped the future for further 3D production. One of the main key factors for this blockbuster was the budget cost of over 230 million dollars, one that exceeded any ground for 3D technology ("Avatar", 2009). Yet the new 3D developments by Cameron were not included in this budget; Cameron, along with other investors, joined to invest their own money into jumpstarting the development (Keegan, 2009). This live-action/motion-capture 3D film development is what sparked the sensation for Cameron's *Avatar*. The invention of the Fusion 3D camera system was a breakthrough for digital 3D films. Director of photography on the film, Vince Pace, said *Avatar* "was a very ambitious film" ("Avatar", 2009). Cameron also developed Simulcam, which allows the Fusion camera user to see into an eyepiece and see the real time in CG elements. This way, the camera could be operated as if Cameron was filming the virtual world of *Avatar*, Pandora ("Avatar", 2009).

Another prominent technological advancement was an algorithm which guides the cinematographer through stereo vision mathematics. Pace believes this will allow focus

for the cinematographer when it comes to making creative, rather than technical, decisions during the 3D process. According to Pace (2009), “It essentially recognizes a focal length and adjusts the controls of the system to provide a starting point. It will also help minimize the number of bad 3D shots. With bad color, you walk away saying, 'That didn't look good.' In stereo, you walk away saying, 'That didn't feel good.' There is a big difference.” Cameron and Pace also limited the number of cameras in the system, to do more with little, for the benefit of director of photography Mauro Fiore. Yet it was the breakthrough of performance capture which held high to *Avatar*'s success. This new system is described by Scott Essman (2009) in “The Making of *Avatar*”. “One of the breakthroughs in *Avatar* was the advent of a new type of performance capture system in which live actors were translated into digital characters through a system in which cameras were attached to the actors' heads via a helmet device that would record the actors every facial movement.” Producer of *Avatar*, Jon Landau said that “Instead of going with what people did in the past, we instituted e-motion capture. Instead of reflective markers, we used an image-based capture on a frame-by-frame basis. On the visual effects end, it's intensive” (Essman, 2009). This new development has changed the way we watch 3D movies, and will continue to evolve into greater things as technology progresses.

Although the hype for 3D was expected, the technological boom has created a problem for many theatres throughout the country. The Associated Press discusses how theatres will have to play catch up to adapt to the evolving technology of 3D. With almost 40 thousand movie screens and counting, only a small percentage has 3D capability (Associated Press, 2009). The success of 3D cinema is pushing theatre owners

to make the convergence. With a tune of around 100 thousand dollars per movie to converge, many theatre owners are wary to make such a decision, yet studios suggest that the pay is well worth the pay off. The Associated Press says that “Studios are pushing theater owners to convert more screens, partly because people pay about \$2 more per ticket and cram theaters for 3-D releases. Revenue per screen is up to three times higher than for the same movie’s 2-D version” (2009).

Now the future of 3D is headed towards us at rapid speed, and James Cameron has been on the forefront of this evolution for over 15 years. So what can be expected of potential 3D entertainment? Cameron discussed a great deal about 3D in cinemas and in home on a USA Today interview. With the latest inventions of 3D home entertainment, and the booming of 3D cinemas, Cameron discussed his thoughts on what is to come. Cameron is a firm advocator in both areas, and is always looking ahead at what can be advanced in the 3D realm. Cameron (2010) said;

We now need the second wave. We had more than enough for Avatar and more than enough for Alice In Wonderland (another new movie shown in 3D). But now you’re going to have film coming upon film coming upon film. We’ve demonstrated that the 3D market is an extremely lucrative market and this is not a fad, this is not something that is going to go away. It’s going to be interesting because (3D) TVs are going to change things yet again. But the TVs are going to take awhile to catch up with the marketplace because there isn’t enough content.

The evolution of 3D technology has come a long ways since its beginning, and with new advancements emerging every day, it will be here to stay.

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