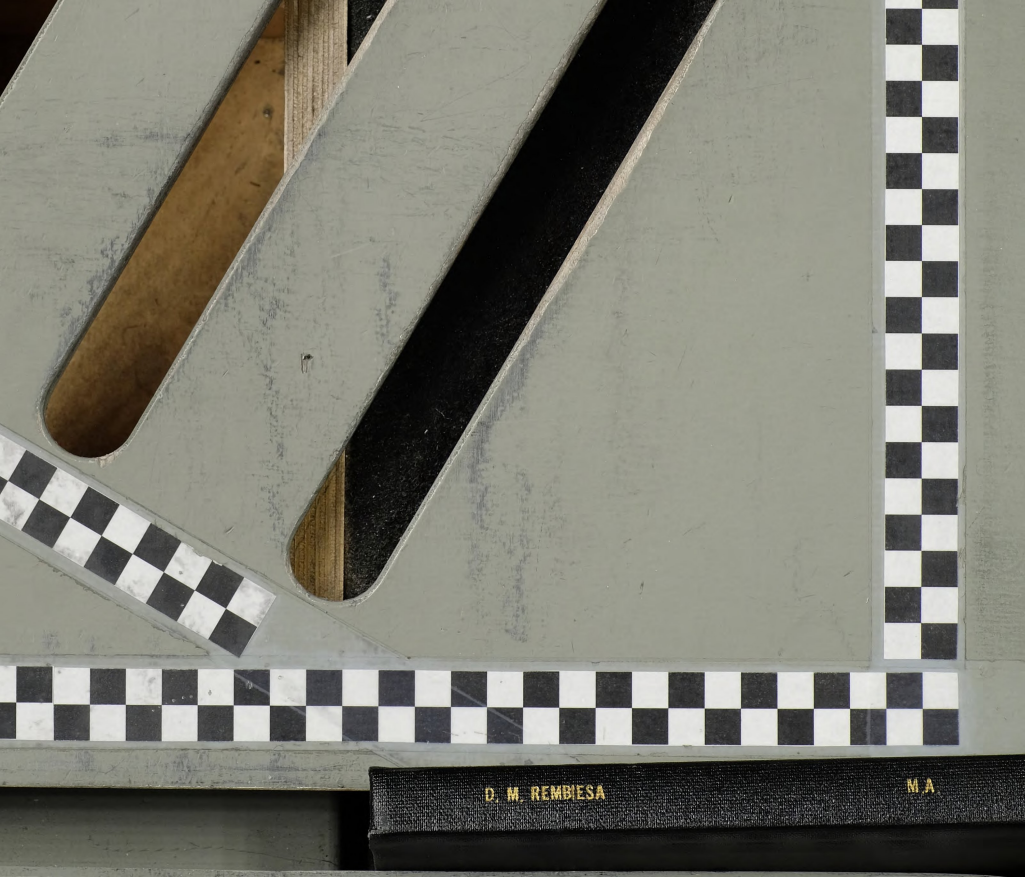
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STAINED GLASS: FILMMAKING IN THE DIGITAL REVOLUTION

By

David Scott Rembiesa

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ABSTRACT

STAINED GLASS: FILMMAKING IN THE DIGITAL REVOLUTION

By

David Scott Rembiesa

A creative thesis project that examines the use of digital technology in filmmaking. The body of this text gives an overview of the new digital production landscape and discusses such aspects as high-definition video, nonlinear editing, digital projection, e-cinema, surround sound, digital film festivals and netcasting. To allow for hands-on research on the methods and practices used in digital production and post-production, an original independent movie short entitled Stained Glass was produced. The finished movie was mastered to a digital videocassette and used for public screenings. After audience members watched the movie they were asked to voluntarily fill out a survey. The survey allowed the participants to comment on their viewing of this digitally produced motion picture and respond to its content, aesthetics and use of digital technology. The audiences' feedback is incorporated into the evaluation portion of this thesis.

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INTRODUCTION

Over the past few decades digital technology has changed the face of media. From music recording to desktop publishing and the Internet, the digital revolution has emerged as one of the most efficient ways to transmit, display and record information. In spite of all these changes, motion picture film is one area of entertainment media that has yet to receive a complete digital makeover. Though digital technology has advanced such areas as film development, special effects, shooting, editing and sound production, the process of recording and projecting movies on digital video has not yet curbed the dominance of celluloid film. That dominance is about to end! As Ken C. Pohlmann, a technical editor for Sound And Vision Magazine, states: "After 100 years of unchallenged supremacy, including countless unshakable predictions that the visual beauty of film stock could never be achieved by mere data, celluloid cinema has a bona fide challenger" (Pohlmann 48). That "bona fide" challenger" is high-definition digital video (HD video). By using traditional film camera lenses, 24 frames per second, a progressive scan field and a 16:9 aspect ratio, high-definition video boosts images that outperform 16mm and even rival 35mm film.

Reaching far beyond its ability to record and display content, digital is changing almost every aspect of the moviemaking landscape. From pre-production on through to distribution, the industry is feeling the effects

of this modern day evolution. Screenwriters are being challenged to create fresh styles and perspectives. Cinematographers are embracing new technology and visual aesthetics. Directors and editors are gaining a level of creative freedom that will continue to enhance their overall storytelling abilities. Sound designers and special effects artists are expanding into new avenues of aural and visual content. Even movie theater owners and equipment manufacturers are reworking their current business models.

The future of the film industry is digital video. The question is no longer how or when will it arrive, but who will survive. Eventually, all moviemakers will be able to digitally shoot, edit and distribute their movies without ever using a roll of film stock. In turn, digital video has tremendous potential for being a cost effective way of producing movies. Though this financial shift will undoubtedly benefit the Hollywood studios, it is the creative independent ones that have the most to gain. As John McIntosh of Res states: "Judging from the quality of work we are beginning to see, the choice of digital video over film indicates not so much a limitation of image quality or even costs as it indicates a filmmaker's aesthetic. Ultimately, better tools are empowering talented filmmakers to make more interesting films" (Macintosh 41).

Over the past few decades Hollywood has seen a sizable share of the market fall into the pockets of independent film companies. Coupled

with the fact that digital video has the potential to accelerate areas of distribution such as digital film festivals, digital video-on-demand and a high-band theatrical Internet termed "e-cinema", there is now an even greater chance for competition within the industry. As the playing field is leveled, independent moviemakers who defy the odds and use guerrilla tactics to bring their bodies of work into the mainstay of popular culture can truly make digital production a filmmaking revolution.

I. DIGITAL MOVIEMAKING

Sifting through the rich history of creating movies, two players emerged: the studios and the independents. During the past few years both of these players have embraced the digital revolution. In 1999 the independent side saw the release of Daniel Myrick and Eduardo Sanchez's, The Blair Witch Project. This movie was shot almost entirely on home video cameras, and has become one of the most profitable movies in cinema history bringing in $180 million in box office revenues. In addition, Mike Figg's TimeCode 2000, a feature length experimental motion picture that was shot using four digital video cameras running on synchronized timecode, was released in early 2000. This picture had a limited run in select theaters throughout the United States and proved to be one of the most profitable independent films of that year. Both of these films were transferred from their digital formats to 35mm celluloid film for release in theaters.

On the studio side, 1999 saw the Twentieth-Century Fox release of George Lucas's Star Wars Episode I: The Phantom Menace. This movie contained an entire live action scene shoot on a Sony prototype high-definition video camera. Episode I: The Phantom Menace, as well as An Ideal Husband, and the independent movies of Dogma and Lock Stock And Smoking Barrel were shown digitally, without film, in several United States theaters.

On the theatrical side, digital high-definition television is another movement that will directly affect moviemaking. The Federal Communications Commission targets May 1, 2002 as the date when all households in the United States will be capable of receiving at least one high-definition television broadcast signal. Using video over film is not a new option for television productions since broadcast quality video has already been a successful alternative format for several decades. In the 1980's, introduction of the Cable News Network (CNN) broke the long established standard of news footage being shot on film. Their philosophy of using video footage in news stories was in complete contrast to the film based network newscasts. As television moves to an even higher resolution digital format, that trend is already making its way into dramas, made-for-television movies, music videos and other conventional film oriented programming.

In December of 1999, the Berlin Film Festival in Germany showcased the world's first production made with a 24 frames per second (fps), progressive-scan high-definition video camera. The production was German director Wim Wender's music video for the group U2, who appear on the sound track of his film, The Million Dollar Hotel. The high-definition video footage of the band was intercut with 35mm film footage from the actual movie.

In the fall of 2000, George Lucas used a similar camera to complete principal photography for Star Wars: Episode II. This camera was outfitted by Panavision, and took advantage of their follow-focus controls, iris rods and high-definition video lenses. Adam Wilt of RES states: "With the dynamic range and tonal reproduction of film, high-definition imaging, digital recording, and the all-important 24fps motion rendering, this may, finally, be the camera to prove video can do the work of film" (Wilt 30).

These productions and technological advancements mark a new trend in motion picture making. From image and sound orientation to post-production and distribution, the recent advent of digital technology in electronic field acquisition may ultimately give greater economic and creative control to productions of all shapes and sizes.

Celluloid Film

Before one can gain a better understanding of the role that digital video can play in a production, you must first understand the image and sound origination that has dominated the industry for the past century. Until recently the process of filmmaking has remained relatively the same. Thomas A. Ohanian and Michael E. Phillips, inventors of the Avid Media Composer and Film Composer nonlinear editing systems, state: "Up until the late 1980's, the manner by which a filmmaker went about creating a film was little different than the process used by another filmmaker half

way around the world" (Ohanian and Phillips 3). This process has been completely dependent on using film. From loading the camera, to physically editing each cut, celluloid film was the only option for high quality motion pictures.

When shooting on celluloid, there are several different film formats that can be used. For years, 8mm film was popular on a consumer level before the widespread introduction of home video cameras. Film stock for this format was relatively inexpensive and many consumer oriented photography labs would develop the film. Despite its widespread popularity, the image quality of 8mm and its upgraded counterpart Super 8mm pales in comparison to that of the 16mm, Super 16mm and 35mm film formats.

For economic and portability reasons, many independent filmmakers choose 16mm and Super 16mm as their shooting format. The use of 16mm is cheaper than 35mm and has a more controlled shelf life. Since 16mm cameras are lightweight, the format established its place in documentary and independent filmmaking. The majority of theaters in the United States show programming on 35mm film, meaning that an eventual transfer, and costly blowup is necessary for theatrical distribution.

For the major production studios and top end television productions, 35mm is the most commonly used format. The physical size

of 35mm film is almost three times the size of 16mm. The larger width heightens the horizontal and vertical image quality. For productions that want to advance to the next level, the film formats of 65mm and 70mm offer an image and aspect ratio that is twice that of 35mm. Unfortunately, because of infrequent usage, this format can be cost prohibitive. The most widely used applications for 65mm and 70mm film are amusement park and museum attractions.

Since its introduction in the 1920's, sound has played a significant roll in the evolution of motion pictures. For decades, audio recorders using reel-to-reel analog tape have been running next to celluloid film cameras. This method of using two devices to record image and sound is known as double system recording. To make sure the audio recording device is running at the same speed as the film camera, a crystal synchronizing oscillator attaches a tone track to the tape. Furthermore, some recorders use generated timecode for a more precise synchronization.

Using a wide variety of sound capturing techniques, a large portion of independent and feature length productions have traditionally used analog recording devices, such as the world famous Nagra audio recorder. With the introduction of portable digital audio tape (DAT) and hard disc recorders, analog devices have fallen out of popularity. Even though this type of audio is recorded digitally, the tracks still have to be

transferred to magnetic film stock and then synched up to its image counterpart.

Digital Production

Celluloid film has been and still is the most widely used format for motion picture productions. However, in the later part of the twentieth century the independent film and made-for-television movie industry saw a larger amount of low-budget productions being shot and distributed on video. Rick Schmidt, a filmmaker who has spent the last twenty-five years producing highly acclaimed low-budget feature length movies, states: "While the picture resolution approaches broadcast quality, video continues to gain momentum as a viable option for producing low-budget features" (Schmidt 239).

The momentum for video as an alternative for shooting motion pictures heightened in the 1990's as the consumer and broadcast video markets saw the release of digital video. Formats such as Digital Betacam, Digital 8, MiniDV, Digital-S and DVCAM have created a high quality option for low-budget independent motion pictures. Many of these digital formats have been given a reference number that help to distinguish their different specifications. One of the earliest formats that reached widespread usage is the 8-bit uncompressed D1, which is the

Society of Motion Picture and Television Engineer's (SMPTE) digital standard.

With the possible exception of high-definition video, many of these digital video formats are not on the same image level as celluloid film. Despite this fact, there are many economic advantages associated with shooting digital. Scott Stewart, who directed What We Talk About When We Talk About Love using Sony's MiniDV format, states:

> There are enough nay-sayers out there who will try to discourage you with warnings like "MiniDV pales in comparison to High-Def." Of course it does, but is image quality a good enough reason to increase your production costs ten-fold? In many cases it might be, but if your goal is to actually make films instead of raise money, you may have to make a few compromises along the way (qtd. in Turk 16).

When a production considers digital video over celluloid film there are several technical factors that can affect distribution compatibility and over all quality. These factors are; resolution, frames per second (fps), aspect ratio, scan format, film stock and sound.

Resolution

There are several options to be considered to increase resolution. Presently, 35mm film is the most widely used format for studio produced

feature length movies. In addition, the 4,096 by 3,112 lines of resolution per 35mm frame is two times the current high-definition video standard. The drawbacks of using celluloid film become apparent when you take costs, volatility and the vast limitations that are inherent in an analog based format.

Digital resolution is measured in horizontal pixels multiplied by the number of vertical lines. High-definition video offers image quality of 1920 pixels by 1080 lines. This rivals 16mm celluloid film and has the future potential to outperform many 35mm based productions. The downside is that many independent productions are cautious about cost and may not be able to afford high-definition video even though it represents a savings of six times that of celluloid film. This is where many of the lower quality digital formats come into play.

In a National Television Standards Committee (NTSC) digital video format other than Digital Betacam and high-definition video, image quality is limited. NTSC has only 525 horizontal lines of resolution. The option for many lower end productions is to move to the European standard of phase alternate line (PAL), which offers 625 horizontal lines of resolution. The biggest drawback for this option is compatibility with equipment used in the United States. Many productions find that they need to invest in other PAL compatible equipment, such as record decks and monitors, which can ultimately raise costs.

Frames Per Second

Another major advantage for using PAL is its frames per second (fps). PAL uses 25 fps, which is one frame off the celluloid film standard of 24. This becomes important when an production uses film as a means of distribution. If a production uses an NTSC format and then transfers it to film, there would have to be some form of transposing, since NTSC is set at 29.97 fps. If a production shoots in high-definition video, this problem can be nullified since there are platforms that record at 24 fps.

The theatrical native rate of celluloid film is 24 fps and allows for universal functionality as the world standard for film. Also, 24 fps has a greater ability to perform slow motion and time-lapse photography. For these reasons, most digital video and analog video productions strive for a rate of 24 fps. Jim Danault, cinematographer for the independent feature The Book Of Life, states: "One of the things that makes video look so distinctively like video is the frame rate. In video the screen never goes dark, as it does with film" (qtd. in Willis "Cinematographer's Perspective" 40). In order to compensate for this, The Book Of Life was shot at a shutter speed of 15 fps. This gave the footage a smoother look that is inherent in using celluloid film. Danault states that this method "[. . .] masked the motion artifacts that occur when transferring 30 fps video to 24 fps film" (qtd. in Willis "Cinematographer's Perspective" 40).

The use of 24 fps is an important physiological element associated with film. The phenomenon, known as persistence of vision, allows our eyes to retain consecutive images long enough for our brain to process them into full motion. By using 24 fps, as opposed to the 29.97 fps in NTSC video, the motion is softer. The year 2000 saw the debut of Sony's HDW-F900 digital camcorder, the world's first electronic image device to record at 24 fps digital. This is a major step for electronic imaging, as Wilt who has reported on the acceptance of this camera in Hollywood states: "Video folks point to their medium's superior temporal resolution, while the celluloid folks insist that video is "too real" and that film's 24 fps provides that slight mental separation needed for dramatic storytelling" (Wilt 28).

Aspect Ratio

The third hurdle that must be addressed by an independent production choosing a digital video format is aspect ratio. In order to compete with celluloid, most of the recent high-definition video formats have a widescreen 16:9 viewing aspect ratio. This is on a par with 16mm and 35mm film. High-definition video was designed to allow for easy transfer compatibility between formats. It was not until recently that the broadcast and consumer digital video cameras have offered a widescreen function. For productions that are without this function, there is an option outside of footage repositioning. By using the 4:3 aspect ratio that is

inherent in a NTSC or PAL format, a 16:9 screen can be blocked out. In production, most shots would need to be shot at a wider angle. Then in post-production, a standard letterbox would have to be applied in post-production.

Scan Format

The fourth hurdle is scan format. There are two major formats that are used in displaying images: progressive and interlaced scan. Celluloid film adheres to a progressive format, meaning that each frame is shown complete without any scanning. Traditionally, computer monitors have adopted an electronic progressive scan format. This means that the image is developed sequentially until its entire frame is displayed. Unlike film, computer monitors use an electronic refreshing rate of 72 Hz or three times the frame rate of 24. The refresh rate accommodates high quality, full motion images and enables computer screens to be used in nonlinear editing. Broadcasters and equipment manufacturers have started to adopt progressive scan format for their forthcoming digital television broadcasts.

In contrast to progressive scan, most electronic image systems use an interlaced scan format. Interlaced images display the odd horizontal lines first, followed by the even ones. Once these lines are combined, they form a complete image frame and never allow the screen to go dark.

Interlaced scan formats are dependent on the standard that is being used. The NTSC format divides the 525 lines and displays the 29.97 fps image at the frequency of 60 Hz, where the PAL format divides the 625 lines of 25 fps image at 50 Hz.

Progressive scan images seem to be the desired format. The major reason for this is the advantage that progressive scan has in terms of vertical lines of resolution. An interlaced phenomena known as "flicker", which is caused by the separation of even and odd lines, is not present in a progressive system. The absence of "flicker" heightens progressive scans vertical resolution. In addition, using a progressive scan image allows for a less complicated transfer to film. This is why many high-definition video based productions are choosing a progressive format over their interlaced counterparts.

Film Stock

The fifth hurdle is film stock. Celluloid film is currently the dominant format in terms of image origination. One major reason for this is the vast array of film stocks and processing that are available. When choosing a film stock, directors and cinematographers have a high degree of flexibility in creating a certain look for their film. There are many categories of film stock that produce different tones, hues, highlights, shades and colors. Combined with the vast scale of lighting, filters and iris settings, an infinite

amount of image possibilities can be realized. Digital video on the other hand is more static. Cinematographers who work on digital video productions, use the format as if it were a single film stock. Results stay relatively consistent among brands and are manipulated more by lighting, filters, white balance and iris settings.

In some instances digital video can even outweigh using film stock. One example is the ability to capture images in low light situations. When shot with film and even analog video, images are usually very grainy and lack depth. In the right circumstances, digital video can produce quality images using candlelight.

When choosing a digital tape format and recording process, a production must look at the compression ratio of the digital signal. Compression is a natural element in any form of digital electronic field production. Even a lossless digital ratio of 1:1 will still introduce some form of compression to the images and sounds. Celluloid film on the other hand does not have any form of compression unless it is transferred to a digital medium. In recent years, 2:1 has been accepted by many broadcasting and high-end post-production facilities as an adequate compression ratio for final program delivery. Recent technological advances and the current wide spread usage of digital video, has brought an array of affordable products using quality compression ratios to independent productions.

Audio

The final area is audio. A key advantage to using an electronic video camera to shoot a motion picture is the elimination of the dual system approach. In most professional digital formats, the audio is locked to the image by an internal timecode clock. There are some formats that are unlocked but they have a slight frame sync slippage. Manufacturers believe there are no noticeable deviations and they generally stay synchronized over a recorded period of time.

Even before the advancement of digital video, vast improvements in the frequency response of recording sound on video tape have given many productions a suitable alternative. With introduction of digital video, productions can now match the sound capabilities of digital audio tape (DAT) and compact discs (CD) inside the camera. This promotes mobility since a separate sound recording device is not needed. In-camera recording allows for a significant financial break, since post-production costs of synching the audio with the image are avoided. Independent filmmaker Rick Schmidt states: "The affordability of digital equipment means that even the no-budget feature filmmaker will soon be able to purchase his or her own sound gear, saving thousands of dollars on the shoot by bypassing normal sync sound costs" (Schmidt 255). Productions that still want to use the dual system approach can benefit from connecting a digital line between the two pieces of equipment.

Since the introduction of digital audio recording, there have been several critics who believe that audio and music should be recorded with the more forgiving and genuine analog methods. Essentially, digital is a sampled reproduction of the actual analog signal. Despite this fact, there are many advantages to using a digital reproduction. Most recording systems use very light compression on the audio signals because of their relatively small file size. The high signal-to-noise ratio of digital helps deliver a clean recording because the floor is much lower and can pick up faint sounds. In contrast many digital tape formats have narrow headroom. Distorted or over modulated peaks and sounds are not overblown, but lost. As improved sampling rates are introduced, these problems can be nullified and digital audio can take the final steps towards matching the range of analog recordings.

After examining the image and sound aspects of digital video, a production must take into account the costs of shooting on a particular format. Currently, most studio-based movies are shot on very expensive film stocks. In contrast, high-definition video and digital video tape can be considerably less expensive than celluloid film. This is primarily due to the fact that film developing for the daily negatives, work and final prints are all taken out of the equation. Developing can cost millions of dollars for many studio projects. Even if you could exclude these prints, 16mm and 35mm negative film stock still costs anywhere from $7 to $25 a

minute. With digital tape what you see is what you get, there is no developing or processing needed. The images and sounds on the cassettes can be played back instantaneously. High-definition video tape cost about $2 a minute with digital NTCS video tape costing even less.

In addition to processing, productions need to take into account the post-production phase. Celluloid film is normally developed and then transferred into a digital nonlinear editing system. Many studio movies also use a large number of computer driven visual and audio special effects. This is found by many productions to be impractical, since they shoot on film, transfer into a digital platform and then transfer back to film. In fact, the use of celluloid film is such an expensive undertaking that some studios would rather have complete digital throughput from shooting to post-production and distribution.

Digital Post-Production

Before the introduction of digital nonlinear editing systems (DNLE), traditional film editing stayed very consistent. Depending on the budget and size of a motion picture, once a roll of celluloid film was shot and approved, the negative was then developed into a larger sized work print. All related audio reels were transferred to magnetic stock and then synched up with each appropriate take. Each film frame on a roll has a

corresponding number, in turn, this allows an editor to use the numbers for an edit decision list (EDL) of in and out points.

When performing the actual edits, film editors have traditionally used grease pencils, razor blades and tape to cut and splice the actual work print together. Each edit was manipulated through the use of an editing machine with a monitor size projection screen, such as a Steenbeck reel-to-reel flatbed or Moviola. Completed scenes and takes physically hang above large open bins until a chronology of the correct sequencing could be established. Once all edits were finished, the EDL was sent out to an optical lab where complicated optical effects were performed such as fades and dissolves.

Many of the styles and techniques used in celluloid film editing were transferred over to analog video tape editing. As video came into use in the 1950's so did a more electronic approach to editing. Originally a method similar to film, analog video editing started to use mechanical systems to cut images. These systems consist of at least two tape decks electronically tied together through an edit controller. The tape in the record deck is "blacked" with continuous timecode and used as a master. The player deck rolls the actual footage, which allows insert or assemble cuts onto the master tape. In order to perform fades or color correction, an effects device was put between the two decks. Dissolves and transitions required an additional play deck, allowing two separate tapes

of footage to "A-B roll". These effects could not be changed without recording over the master tape.

Despite their recent loss in popularity, film cutting and analog video editing methods have their advantages. When cutting film, there is a level of nonlinear control, since pieces can be physically cut and repositioned. Analog video editing negates the optical lab and allows for real time effects. Both of these advantages are incorporated into many of today's DNLE systems. Likewise, the advent of digital compression, the ability to access footage randomly and easy-to-use software interfaces have helped develop DNLE as a powerful post-production tool.

In recent years, DNLE image and sound manipulation has entered both sides of the film industry with great force. Systems that edit film based footage are usually outfitted with a film scanner. The scanners use lasers, which turn the analog oriented footage into digital images. Once these images are manipulated in a DNLE, the results are transferred back to film. These systems are known as digital film workstations (DFW). All DNLE systems outfitted for video use the same basic principle. However, instead of using a film scanner, digitization and exportation is channeled through an image matrix card inside the computer. These systems are sometimes known as digital video workstations (DVW). No matter what system or format is used, the process of digital manipulation and editing is usually referred to as DNLE.

As DNLE continues to push the envelope, a higher level of editing control can be achieved by both independents and studio based motion pictures. DNLE allows an editor to test, explore and arrange an entire motion picture with the click of a button. As a result, editors and directors are not locked to one story line or set sequencing.

A key factor for a DNLE system is the way it stores images and sounds in the computers hard drives. In a typical setup, digitizing one second of uncompressed stereo audio at 16 bits per sample, takes about 17 MB of space. A second of NTSC video overshadows this uncompressed rate at 92 MB, while high-definition video, 16mm and 35mm film can use between 100 and 960 MB per second. One advantage of these lower fps formats is the fact that there is less frame information to digitize and store. Consequently, the higher resolution adds to the vertical and horizontal pixel matrix. In comparison, NTSC video has 307,200 pixels per frame and requires 3 bytes per pixel, where as 35mm film has 9,739,584 pixels and requires 10 bytes per pixel.

Over the past decade, the hard drive space and chip processing that was required to run a DNLE system kept prices very high and out of the hands of independent moviemakers. Fortunately, the computer industry is not technologically and economically stagnant. As the famous theory, "Moore's Law", explains, one years computer technology will be outdated within two years by technology that has over twice the

performance power and half the cost. Recent marketing trends have seen the consumer market and lower end independents as profitable arenas for selling DNLE systems. As these types of systems keep falling in price, independent moviemakers will have a greater amount of access and choice. Bob Parks of Wired states: "With today's advances in speed and memory, it's possible to do online editing on your desktop, bringing the entire film into the computer in its highest quality before editing" (Parks 224).

There are two different layout specifications for DNLE systems, online and offline. In online editing each clip of video or film footage is scanned or digitized into a hard drive. This process is normally done in real time, meaning that a minute of footage takes at least a minute to digitize. From here each clip can be randomly accessed, adjusted and manipulated within a timeline. This setup is referred to as "online" since the final product is ready for distribution. In offline editing, each clip is usually digitized or scanned at a lower resolution. Once the timeline is complete, the original footage is then put together in a linear fashion using the EDL. This method helps to lessen pixel matrix size and negates using high amounts of storage space. This trend is drastically changing as digital compression ratios increase and storage space becomes affordable.

Many of the benefits of using a DNLE can be enhanced when a production uses a digital camera to shoot the footage. This can mean a sizable time advantage for editors and the production crew. Since there is no need to develop celluloid film, a director can view and approve the footage instantaneously on the set. Gavin Bocquet, production director for Star Wars Episode II, states:

> Because we're shooting with a digital camera, there's no real need for rushes. Everybody's seeing the final reproduction precisely on a very sophisticated monitor. On the day of shooting they're seeing actually what you see, rather than having to wait until the next day to see the rushes or the transfer from the film to tapes three days later. You get clearance on the set almost the day you finish it (qtd. in "Episode II: Keeping Pace").

Digital throughput also means an editor can create a rough cut of a scene on location. In turn, directors and editors have greater control over developing the sequencing, cutting and flow of the piece with the production setting at their disposal. Ben Burt, visual editor for Star Wars Episode II, states:

> Once the footage has been logged it comes to me, which can happen the same day. I try to put together one scene each day, so I'm not quite keeping up. This part of the work is fun

because the big pieces come together and we start to have a movie before production has even wrapped (qtd. in "Episode II: Production Update").

One drawback of using a DNLE system with analog oriented footage is the "real time" digitization and scanning process. With digital throughput, this process can be negated since many systems allow digitally oriented footage to be moved as easily as copying a computer file. By connecting a digital wire between the digital tape deck and the DNLE system, signals can travel by means of high-speed fiber optics. This process comes close to lossless compression and can be up to seventy percent faster then a real time digitization process.

There are many DNLE platforms available to independent and studio based productions. Like any product, DNLE systems manufacturers achieve financial success by drawing in customers. The key to differentiating their product from competitors is through interface design. The majority of interfaces fall back on the key principle of using a visual timeline to maneuver randomly accessible clips. DNLE interfaces can be judged on several factors including the amount of image and audio tracks that are available. Typically, because of their focus on image quality, DNLE systems accommodate only a limited number of audio tracks. This can hurt a production's sound versatility and overall mix, since most feature length motion pictures use hundreds of different audio

tracks. Furthermore, the audio tools that are included with the software are typically limited in their functionality. This is why many productions choose to use an entirely separate post-production system built only for sound editing. These systems are referred to as digital audio workstations (DAWs).

DAWs were introduced in the early 1980's, and are credited for being the forerunners to DNLE editing systems. Earlier versions facilitated nonlinear audio editing through the use of slow read optical discs. Since images were not digitized into these systems, DAWs were linked to a master tape deck for visual reference. This hindered the audio sweating process, because editors were dependent on the speed of the shuttle based decks. Today, DAWs use high speed magnetic drives and can digitize images into an attached drive. By having the images digitally linked to the system, pinpoint sound to image accuracy can be achieved. Many units are also equipped with multi-track mixing boards and digital surround applications that accommodate large scale sound design.

Since their introduction, DAWs have become a key component for producing motion picture sound tracks. DAWs allow film productions to negate the use of expensive magnetic tape stock. Magnetic tape stock has traditionally been the most common method for transferring sound tracks to the theatrical release prints. When tabulating cost, it should be noted that the average feature length film can use, store and dispose of

up to 30,000 pounds of magnetic stock. By using a DAW, sound editors only need to use magnetic tape stock for the final mix.

In terms of overall sound quality, DAWs using digital mixers have virtually eliminated the electronic phase distortion that is prevalent in most analog equalization systems. The advantage of digital signal processing allows the use of complicated sonic effects that can be altered almost instantaneously. Larry Blake, sound editor for the independently produced Sex, Lies, and Videotape, states: "The big advantages of digital, on a pure sonic basis, are that you don't have to work as hard to achieve a given level of quality" (qtd. in Ohanian and Phillips 172). For this reason, the relatively small file size of a digital audio signal has established DAWs as an efficient and affordable option in terms of hard drive storage space.

Another advantage for using both a DNLE system and a DAW is file exportation. Most audio mixes done with a DNLE system are temporary. The use of this audio is important to the final mix and creates a structure for the overall sound design. One way of transporting these tracks into the DAW is to lay the tracks off to digital magnetic tape. The tape can then be redigitized into the audio system. Since these clips are digital, sound designers may prefer to have the audio files exported directly into the DAW. Many systems use a file transfer format that can maintain clip information and allow access to the original length of the piece. Presently, there is no industry wide standard fro this type of exportation.

This can cause compatibility problems when a production contracts a separate company for sound editing. For this reason, The Audio Engineers Society is developing a standard audio platform to accommodate a wider range of systems. Gart Eskow, who reports on new audio developments for the magazine Video Systems, states: "The audio-for-picture community is moving rapidly toward a set of standards that will make it easier to use equipment from different manufacturers on a single project" (Eskow 80).

In addition to their editing capabilities, DNLE and DAW systems incorporate several special effects options. Co-designer of the Avid DNLE interface, Thomas A. Ohanian, states: "One of the major reasons why DNLE and DAW systems have been embraced by the film editing community is the ability to see and hear many different types of effects during the editing process instead of waiting for the effect to be created by a film lab and then returned to the editor (Ohanian 15). In order to use the advantages of digital effects, one must convert from analog to digital and then back to analog. Even though these digital effects have changed the face of cinema, it is the redundancy of scanning and digitizing and then outputting back to analog that has propelled the motion picture industry into the realm of end-to-end digital production.

In the late 1970's, George Lucas pushed the envelope of what was to be expected in analog based special effects. Today, digital effects are

now common in a vast majority of studio and independent releases. What was once thought of as storytelling tools for action and science fiction movies, special effects have found their way into genres such as dramas, thrillers and period pieces. Rob Legato, effects designer for Titanic and What Lies Beneath, states: "The challenge is to enable the camera to go places where anyone familiar with the territory of a film set or a camera system knows that a camera could not go" (qtd. in Rogers 60).

Many digital effects applications and software can be used in connection with a DNLE or DAW system. Some programs are "plug ins", which launch directly in the systems software, while others use designated effects workstations that can digitally transfer files between systems. These designated effects stations are normally used to process certain scenes or portions of a motion picture. The results are then digitally married into the rest of the movie.

Powerful systems and software that were traditionally used on big budget productions are slowly being implemented into affordable packages. Adobe's After Effects, Boris Red and LightWave offer some of the tools that expensive digital workstations such as Flint, Smoke and Maya use. These tools are making the traditional methods of movie production obsolete. No longer do titles and graphics have to be transposed and printed onto film because they can be layered and rendered on the desktop. Two and three dimensional graphics and

animations can now be incorporated into live action images without the use of an optical printer. Cloning can make a sparsely attended sporting event look crowded. Image and pixel manipulation no longer has to be processed by a lab or routed through a time base corrector. Transitions and superimpositions can be adjusted almost instantaneously. Matte backgrounds can now be rendered inside the image. Motion photography can use digital effects processing to change framing, cut between angles and enhance the speed of an image while unwanted portions of the images can now be digitally removed. When a production combines the power of all these tools, they are in essence using a digital backlot. By incorporating digital effects, images, sounds and environments can be made without ever having to build a set or prop.

Contrary to what one might think, the use of the digital backlot is not dominated by big budget features. The cost effectiveness of using this type of post-production technique is based upon the idea that funds, which were once used for shooting on celluloid film, can then be transferred into the effects budget. When asked about the digital backlot, George Lucas stated:

> Any director who wants to, will be doing it this way. I think that there are already a lot of independent film directors working digitally. It's coming from the bottom up, and there

are a few of us on the topside that are using it. I assume it'll start moving into the middle (qtd. in Migid 32).

II. DISTRIBUTING A DIGITAL MOVIE

As the quality of digitally stored images and sounds reach new levels, many distribution sources may drastically change. As Holly Willis of RES states: "There are plans for the opening of all-digital theaters; several have inaugurated online distribution arms; several major film festivals, including Sundance, are planning to implement digital projection systems and there are a startling array of advances in terms of digital technology, from projection to highly effective encryption processes" (Willis "Electronic Hollywood" 14).

Since many of the traditional means of distribution have become non-inclusive for independents, new digital mediums such as digital film festivals, the Internet and electronic cinema (e-cinema) have opened new avenues for independent moviemakers who wish to get their movies viewed by an audience. Even Hollywood has taken advantage of these new distribution methods and the changing digital landscape.

E-Cinema

E-cinema or digital cinema has the potential to completely revolutionize the motion picture theatrical system. The idea behind e-cinema is to digitally transmit movies to a central computer server, which can then be digitally projected onto a theatrical screen. Once the movies or programs are downloaded, the server can provide switching, routing

and event scheduling. By establishing a network of high-band fiber optic cables and satellites, e-cinema boasts a new way of distributing and viewing motion pictures that is both resourceful and responsive to the viewer's needs.

The current method for distributing movies revolves around the idea of renting and shipping celluloid film prints. This leaves motion picture distributors with the difficult task of estimating the number of prints that should be made for a soon to be released film and theater owners the task of deciding how many copies they will need. As this inventory becomes fixed, theaters are then stuck with a predetermined amount of prints. As Barry R. Litman, author of The Motion Picture Mega-Industry states: "The multiplex theater owner must not only subject himself/herself to the vagaries of public taste for each and every movie, but it must guesstimate the length of run in signing contracts with distributors" (Litman 49). This can account for supply shortages. If a theater fails to order the correct number of prints, they cannot add additional showings of a sold out movie. E-cinema may have an answer to this problem. If one movie is outperforming another, theaters using a network system can download additional copies within a relatively short period of time. By downloading the movie, there will be no need to ship expensive film prints and supply can truly answer demand.

Far from the enhancements that e-cinema brings to theatrical distribution, it also poses a threat. Distributors may be unresponsive to adopting e-cinema networks for several reasons. The first barrier is security. The digital transmission of audio and visual information will need to be protected by an adequate means of data encryption and watermarking which can leave traces of the date, time and location on each digital copy of a motion picture. Consequently, e-cinema networks will have to be built on independent intranets that are not connected to the outside Internet. This will help keep unwanted thefts and hacking out of the systems. If a movie is digitally stolen off an e-cinema network, a thief could essentially have a digital master copy. Since the integrity of the information is digital, this copy could then be used to make endless numbers of high quality reproductions.

A second barrier for the adoption of e-cinema is the matter of completely revamping the current equipment and methods used in distributing a motion picture. An overhaul of the current American theatrical system will be a costly endeavor. Converting a single theater to e-cinema has been estimated at $150,000 with a complete nationwide renovation costing over $5 billion (Ohanian and Philips 277). For this reason electronic manufacturers and Hollywood studios will need to assist theater owners in their refurbishing. Robert Lehmer, Executive Vice

President of Cinecomm Digital Cinema, a leading e-cinema service provider, states:

> Our plan has us paying for the installation and retrofitting of cinemas [. . .] In fact, our business model is similar to that of Western Electric's business model - when theaters made the shift to sound in the 1930s, Western Electric paid for it, and I think that's the only way it will happen (qtd. in Willis "Electronic Hollywood" 15).

The arrival of e-cinema will bring a new set of long term overhead costs. The current system of loading and projection film has been around for over a hundred years and is relatively easy to maintain and operate. Converting to e-cinema means that several complicated pieces of equipment such as new servers, networks and projection systems will need to be implemented. Similar to a radio or television broadcasting station, owners will need to employ several highly trained technicians to operate a standard multiplex theater. This will essentially raise overhead costs, drastically impacting the price of admission and ultimately effecting the financial success of a theater.

The greatest threat to e-cinema is the studio system. Hollywood based movies dominate the current distribution markets and produce the most profitable motion pictures. Since e-cinema has the means to introduce more competition in theatrical markets, it may meet adversity.

By keeping the price of renting celluloid film prints high and the number released fixed, the current system does not allow theater owners to take a chance on products that do not receive the same wide spread publicity as studio based movies. Pohlmann states: "With e-cinema, everything changes. Any digital-based film could be streamed into any theater, bypassing traditional distribution channels. Struggling maverick filmmakers could more easily find an audience" (Pohlmann 48). By avoiding the expensive 35mm film blowup, productions could distribute their movies on inexpensive digital formats and then show them in any digital theater. Now independents will not only be able to produce affordable digital motion pictures, but e-cinema can facilitate the access needed to turn a profit. If major studios have to continually compete with independent blockbusters such as The Blair Witch Project, they may not want to adopt a system that allows for more access. Without the release of studio movies in an e-cinema format, the success of this platform could easily be in jeopardy.

In contrast to the dilemma of added competition, the industry is also aware of their need to offer consumers a new and more flexible viewing experience. Since the 1940's, the amount of theater patronage has steadily declined. During the past six decades, the introduction of television, cable and video rentals have given consumers several alternative viewing options. As attendance and profits fell, the industry

eventually embraced these new technologies and now use theatrical exhibition as a springboard for a more extensive marketing campaign. This successful business module may need a drastic overhaul when high-definition television (HDTV) becomes common in American households. Proliferated access to high quality products will once again change the delivery balance between theater and home exhibition. This highlights an even greater need for responding to the competitive potential of this medium. E-cinema could refuel theatrical attendance resulting in greater profits for the industry as a whole.

One fact that may point towards increased patronage is the way consumers have recently adopted new digital entertainment technologies. The rapid success of Digital Video Discs (DVD) and the Internet, have brought new light to the desires of consumers and their ability to use alternative formats. Much like these technologies, e-cinema has the potential to allow for interactivity with viewers. Even live sports, musical concerts and large events could be shown in an e-cinema venue. These factors can combine the excitement of an out-of-home event with technology that is new and intriguing. E-cinema has the potential to expand and revolutionize the theatrical distribution sector and bring new life to one of the oldest forms of visually recorded entertainment.

A recent trend that points to the future adoption of e-cinema would be the current agendas of traditional film suppliers. Eastman Kodak, the

largest supplier of celluloid film, has recently partnered with Qualcomm to offer a fully integrated digital cinema system. Kodak hopes that Quilcomm's methods of compressing, watermarking and encrypting digital information will help them establish their name in future exhibition markets. Variety's Jill Goldsmith, states Kodak is "[. . .] letting the film industries know it still plans to be a major player in their world even if the medium shifts to digital from film in coming years as many anticipate" (qtd. in Conner 3).

At the present time, the Society of Motion Picture and Television Engineers (SMPTE) is reviewing all matters dealing with digital production and presentation. Their agenda focuses on creating standards for the national rollout of e-cinema. This process will bring many questions regarding sound, image resolution, aspect ratio, motion, hardware requirements and bandwidth.

In addition to revolutionizing the theatrical distribution sector, e-cinema will also enhance the development and production of motion pictures. Network transmission of digital signals is already prevalent in the audio realm. Currently, elements such as remote voice-overs, sound effects and music are being sent from distant locations. Nevertheless, these networks such as Integrated Services Digital Networks (ISDN) and Asynchronous Transfer Mode (ATM) are not suited for the transmission of high quality full motion images. E-cinema, using satellites and fiber optic

cables, could bring the proper network support to facilitate high-definition video applications.

One such application is distant post-production, which uses high end networks to give movie directors and editors stationed all over the world the ability to design and develop within work groups. At the same time, a group of special effects artists can develop different image and sound prototypes, while a motion picture crew shoots on location. This will allow a cinematographer or director to integrate newly developed effects into their scenes. Even the distant viewing of dailies or outtakes from a casting session can all be achieved when a production chooses to shoot, edit and transmit digitally. Peter Moyer, president of Digital FilmWorks, states:

> I really look forward to the development of high-speed data links so that we gain the ability to share material and to view material across long distances and without a lot of delay. It won't matter where an artist is [. . .] you can send your work there and monitor the progress remotely (qtd. in Ohanina and Phillips 221).

Digital Projection

The biggest stumbling block for e-cinema in the theatrical realm is projection. Traditionally, when post-production is done digitally, the

footage goes through a process know as telecine which converts analog film into a digital signal. Once converted, this signal can then be stored in a hard drive or on digital videotape. From here the project may be manipulated in a DNLE system. One drawback relating to this process is the complication of transferring finished digital projects back to celluloid film for theatrical distribution. This is why moviemakers usually edit digitally in an off-line fashion, log an EDL, and then recut the actual film negative for the master print of their movie.

Currently, the flux of new high quality digital tools is bridging the gap between off-line and on-line editing. Even though these technologies allow productions the ability to digitally finish a project, digital projection is the missing link for a true end-to-end process. Without this throughput, the economic and time saving advantages of digital moviemaking may never reach its fullest potential.

With over a hundred years of development, the current standard of celluloid projection has an upper hand in terms of image resolution. Manufacturers and entrepreneurs involved in the e-cinema process know the importance of reaching the quality of celluloid film. If digital projection delivers a product that the audience rejects, the status quo is sure to reign supreme. In the past, digital projection has been mediocre at best and could project enough lines of resolution to accommodate NTSC video. This is beginning to change. As Putman states: "Advances in projection

technology - high brightness, high resolution and film-like color gamuts and grayscales - have made it possible to screen cinema-quality images without 16mm or 35mm film" (Putman 32). Currently there are several key technologies that are bridging the gap, as Texas Instruments and Hughes-JVC have recently brought new light to the area of digital projection. Both of these companies have developed prototype formats that may be adopted by future e-cinema systems.

Texas Instruments has designed and developed the Digital Light Processing (DLP) system, which displays images through three semiconductors Digital Micromirror Devices (DMD). These microchips are armed with thousands of aluminum mirrors that rotate light beams toward the optical projection lens. The mirrors on each chip move 5,000 times per second as their light reflection simulates binary code. Each DMD chip corresponds to the three component colors of red, green and blue. By housing the system in a traditional theatrical lamp projection unit, an image resolution of 1280 by 1024, an aspect ratio of 5:4 and 10,000 lumens can be obtained.

The second projection technology that has gained momentum was designed by Hughes-JVC and is known as light amplification. This system revolves around using cathode-ray tubes and Liquid Crystal Displays (LCD). By optically transferring the component colors to each tube, a reflective LCD imaging system can boast a resolution of 1365 by

1024, a comparable celluloid film aspect ratio of 2:35:1 and 4,000 lumens. Hughes-JVC is currently developing a 2000 resolution system that will deliver over 12,000 lumens. As the capabilities of LCD displays expand, there will be a greater opportunity to match the 4,096 by 3,112 lines of resolution projected by 35 mm celluloid film. Currently, SMPTE is investigating the proper resolution for digital projection. The Study Group On Digital Cinema, known as DC 28, concluded that a standard of 4,000 is ideal even though initial versions will start off at 2,000.

Today manufacturers such as: Sony, Panasonic, NEC Technologies and IMAX are producing flat-matrix digital projectors using both of these two systems. The technology of laser projection is also being researched and tested by many leading electronics firms. Similar to the Kodak and Quilcomm partnership, manufacturers are pursuing the development of high-end digital projectors in order to position themselves as a complete provider of digital products.

A key advantage for using digital projection is image and sound integrity. Unlike celluloid film projection, which brings unwanted wear and tear to expensive prints, digital allows a motion picture to be viewed and heard perfectly every time. As Larry Thorp, Vice President of Acquisitions at Sony Broadcasting and Professional Group, states: "[. . .] digital allows for more consistent quality per screen [. . .] this quality can be sustained day after day, unlike prints which get worn out and vary from theater to

theater" (Willis "Electronic Hollywood" 14). If wide spread digital projection is adopted, the undesired by-products of celluloid projection such as scratches, fading color and drifting focus may become a thing of the past.

Digital Surround Sound

Recent advances in digital technology have brought motion picture sound editing to its pinnacle. This has resulted in wasteful sound distribution processes, since analog optical tracks are still being incorporated into release prints. At the present time, there is no standard for theaters broadcasting in digital surround. Instead, there are three primary processes and one method of encoding and transmitting sound that are used in American theaters. The most economical and practical of the current digital standards are Dolby's Digital, Ultra-Stereo and Surround as well as Sony's Dynamic Digital Sound (SDDS). These supplier's processes encode their digital sound onto a region of the actual celluloid film print. DTS on the other hand, transmits sound through a system that is independent from the film projector. Timecode marks are placed in between the film sprockets and a separate device is synced up with the film. This method requires two distribution elements, a film print and a digital disc for surround sound. Lucasfilms Limited's THX is not an actual encoding process and instead a method of location recording, post-

production and theatrical delivering. THX uses Dolby Digital and focuses more on developing proper sound from production to distribution.

Unfortunately, none of these processes and methods may be compatible with the purposed digital e-cinema formats. Though the encoding advances made by the suppliers will insure their product's longevity, e-cinema will eliminate the need for analog methods of distribution. Many feel that it is important to have a backwards compatibility with current theater equipment. Robert Rast, Vice President of Electronic Media at Dolby Laboratories, states: "Theater owners have made a substantial commitment to digital audio, equipping theaters with digital processors. One of the design constraints in e-cinema should be backward compatibility with the embedded base of cinema processors" (Rast).

Still in its infancy many of the sound standards for e-cinema have yet to be decided. Arguments over the sampling methods have risen, as SMPTE looks to expand the sound range from 48 kHz to 92 kHz. This higher fidelity platform will accommodate a wider range of audio and will leave ample headroom for future improvements in sound quality.

The idea of sound compression has also surfaced. Though uncompressed stereo sound at 17 MB per second occupies one-sixth of the space that high-resolution video needs, compressing audio can amount to significant storage savings. This leads to issues on the overall

quality of e-cinema sound delivery. Should sound integrity be compromised or does the idea of light compression at 11 MB per second make for a more popular alternative?

Additional issues have risen over developing an all inclusive surround sound standard. Despite the influence of Dolby, Sony and DTS, many believe that a standard is the only way to truly capitalize on the digital asset of e-cinema. This has lead to debates on whether to make standards in interfaces or components. Rast states: "[. . .] the likely appropriate solution is that certain interfaces would have to accept/deliver signals meeting those standards. Such an approach can assure compatibility, while still permitting competition among component manufacturers" (Rast).

If a standard arises, it is probable that a 10 channel system with an additional metadata track would be proposed. This would expand on the popular 5.1, 6 and 8 channel systems that are widely available in many theaters, by accommodating additional side and rear surround speakers. By adding metadata tracks, this will help accommodate services for the hearing impaired, bilingual persons and allow for technical data to be communicated to theater technicians.

A key advantage for having an inclusive format is the prospect of financial savings in post-production. Currently, low-budget movies that do not have heavy financial backing must rely on the analog optical stereo

tracks for their sound distribution. In contrast, productions that have the budget to accommodate surround may not have the finances to produce film rolls that accommodate all three versions. This excludes many independent movies from presenting in surround and forces studios to inflate their budgets since they must release movies with all three formats in mind. A set standard for e-cinema networks would mean that more independent productions could raise the overall presentation quality of their movies and lessen the financial burden on their distribution budgets. In turn the results can lead to more options for consumers and ultimately create new markets for distribution.

Digital Film Festivals

The 1990's saw a dramatic increase in the amount of national and international film festivals. Growing ever more important, festivals such as Sundance, Toronto and Cannes have become a breeding ground for Hollywood and large independent studios searching for the next big hit or cult blockbuster. Traditionally, movies showcased in these festivals have been shot and edited entirely on celluloid film and employ high quality production elements. The selectivity and competition derived from these festivals has recently spawned a backlash with the emergence of digital and alternative film festivals.

Digital film festivals set their benchmark on movies that communicate interesting and inspiring stories. Nevertheless, the digital festivals also focus around honoring technological innovations. One of the most popular digital festivals is Resfest. Traveling to such cities as Los Angeles, San Francisco, Chicago, New York and Orlando, Resfest highlights independent films that are using the latest tools offered to digital moviemakers. Jonathan Wells, director of The Resfest Digital Film Festival, states: "All films featured in Resfest have been finished in the digital realm--some of the films are shot in video, some in film [. . .] and some completely computer animated or some combo of the above" (qtd. in Hawn).

In an effort to give independent moviemakers a chance to showcase their digital projects to audiences, Resfest became one of the first festivals to use digital projection. By purchasing a handful of lower resolution projection systems, Resfest found an alternative to costly 16mm and 35mm screenings. Unlike several notable festivals, Resfest offers smaller budget moviemakers an affordable option by allowing them to submit projects on digital tape.

During the year 2000, the digital festival phenomenon took on such touted film festivals as the Sundance. Sundance, which traditionally has had a film only policy, for the first time opened its doors to digital films. This was partly due to the explosive hype generated by the counter digital

festivals of No Dance and Slamdance, which take place in Park City, Utah during the same week as Sundance. These two festivals generated over 500 entries and digitally projected over 100 movies on formats such as high-definition video, DVD and DVCAM.

The acceptance of digital movies did not stop with Sundance. The 2000 Cannes Film Festival gave their top prize to the Lars Von Trier's digital feature Dancer In The Dark. In addition, Northwestern University held the world's first high-definition film festival, HDFEST. This festival showcased numerous movies, documentaries and television shows that had been shot or edited using high-definition video. The idea behind this festival was to give the new format a venue where users could showcase and discuss their accomplishments. Attendance at HDFEST was high, setting new ground on the possible acceptance of high-definition video by the general movie going public.

Many of these digital festivals generate advertising, corporate sponsorship and receive attention from the new wave of online movie broadcasters known as netcasters. In an industry were the amount of original content is high but quality is still in demand, film festivals give netcasters the perfect avenue for securing online distribution rights. Sites such as iFilm, AtomFilms, SightSound and Sputnik 7 all pool their content from the nearly 600 festivals that take place each year. Many online film sites are creating partnerships with time-tested festivals such as Austin's

South By Southwest, New York's Pop Sustainability Film Festival and Seattle's D.FILM. These partnerships help netcasters secure a valuable content recruiting base. Netcasters can also benefit from attaching themselves to festivals since it gives them an advertising outlet for their key audience members. By sponsoring cutting edge digital and alternative film festivals, their sites are put into the minds of film enthusiasts. As Scott Smith, who reported on Sundance 2000, states: "Another big buzz at this year's fest was the activity of dot-coms as they attempted to build their brands with the film community as well as continue their hunt for content" (Smith "Say Goodbye" 59).

The digital and alternative festival boom is due largely to the availability of affordable digital equipment. As Ed Eberle of Film And Video states:

> Just as high speed 16mm color negative-the handheld Eclair NRP, the Nagra 4, the Sennheiser 815 shotgun microphone, and the flatbed editor-became the working kit of the independent film movement circa 1970, the latest generation of filmmakers are framing the world with the tools of their times (Eberle 53).

More then ever before moviemakers can write, shoot, edit and master their movies using some form of digital technology thus making the output of the independent sector the largest in its history. It is no wonder that

film festivals continue to be one of the driving outlets for independents and has helped push the use of digital technology into the hands of individuals who want to make motion pictures.

Web Promotion

Ever since the Internet took shape as a digital means to promote and sell goods and services, independent moviemakers have applied their all out guerrilla marketing tactics to the World Wide Web. In an effort to compete with Hollywood movies and their advertising budgets, many independents use the Internet as a place to stir up audience interest. By using peripheral content such as photographs, behind the scene footage, trailers, interviews and plot scenarios, independent moviemakers have found that this digital medium is suitable for grass-roots promotion.

Unlike many of the independent hits, such as Clerks, She's Gotta Have It, Sex, Lies and Video Tape, Artisan Entertainment's The Blair Witch Project used a Web site as one of its primary marketing tools. Stylizing the site to have authentic looking newsreels, interviews, police reports, diary entries and fake historical text, the Web site tricked some people into believing that everything in the actual movie was real. The hype became so intense that the Web site reached over 2 million hits a day (Ascher-Walsh 36). Many insiders viewed this as ingenious, as an undisclosed Hollywood studio marketing executive told Newsweek:

"We've all had Web sites for all our movies for years, but this was a Web site that was an entertainment experience in itself. The movie was an extension of the Web site, not the other way around" (qtd. in Ansen 50).

In the year 2000, Disney Studios took a lesson from The Blairwitch Project and promoted Unbreakable through a content Internet site. Fictitious stories, games, surveys and mini-movies made up the vast amounts of content. In fact, this site is such a complete independent entertainment entity that it does not directly connect the audience with the actual movie. It offers fans and viewers an experience beyond that of the theater or television. Peter Lunenfeld, author of The Digital Dialectic: New Essays On New Media, states: "Back stories - how the movie was made, other plots, subplots and adventures, and related experiences like video games and fan websites - are fast becoming as important as the film's story itself" (qtd. in Willis "Electronic Hollywood" 16).

Fan and viewer anticipation for some movies can be so strong that many are capitalizing on the interactivity and spontaneous delivery of the Internet. Consequently, the Web can become a powerful marketing tool for spreading word-of-mouth among core audience members at a fraction of the advertising cost of print, television and radio. One of the most important marketing mechanisms is showing movie trailers on the Web before they are even released in theaters. Early Internet distribution of trailers can drastically increase site traffic and solidify a movie's fan base.

Over the past few years, Apple Computers have offered high quality QuickTime movie versions of trailers that can be downloaded within minutes from their main site. Combined with the Apple QuickTime streaming servers, which offers advanced image and sound, skip protection and three-dimensional (3-D) imaging features, viewers with standard modems and connections can experience a wide variety of motion picture trailers and over 200 kinds of Web media in their homes. By boasting such highly anticipated trailers as Star Wars: Episode I, Blair Witch 2: Book Of Shadows, and X-Men, QuickTime players have become the leading Web streaming devices with over 100 million users worldwide. One key reason for Apple's touted success over competitors, such as RealNetworks, is their ability to tap into motion picture audiences.

In addition to using the Internet as a means to promote their movie, many independents and lower end studio based productions use the Web as a means to sell their movies on videocassette and DVD. During the past few decades, many locally owned video stores have been bought out by corporations. Since the majority of these corporations have financial interest in Hollywood studios, they impose harsh restrictions on which independent movies can be stocked. Meanwhile, most theatrical venues have stopped showing independent movies all together. Despite losing these important outlets, the Web offers a solution for independent distribution. Lloyd Kaufman, co-founder of Troma Entertainment, states:

"It doesn't matter how many people want to rent Troma movies-they won't be able to if store owners refuse to buy them [. . .] Newly important in the sell-through market, and to the continued survival of film companies like Troma, is the World Wide Web (Kaufman 194).

Movies looking to be sold online can use a third party vendor to help attract traffic and customers. The biggest online retailer, Amazon.com, has recently entered the home video and DVD sales market. Amazon.com's huge online resource specializes in having even the most obscure titles. Adam Pincus, of The Independent Film & Video Monthly states: "Independent filmmakers can now leverage Amazon's brand-awareness, not to mention its considerable customer base, to draw potential consumers to their product (Pincus 42).

Netcasting

In addition to marketing and selling motion pictures online, the Web is becoming a popular exhibition venue. The past few years have seen an explosion of online netcasters who use original content ranging from talk radio, weekly television series and independent movies. These video-on-demand services allow audiences to choose when and what they will watch. Similarly, they offer user interactivity through chat rooms, video conferencing and e-mail.

Most netcasters have a consortium of channels, which contain hundreds of programs that can be streamed to any online users. Programs are either broadcast live or archived on high capacity network servers and streamed to users through video and audio Internet players such as QuickTime, Windows Media and RealPlayer. Most of these companies are broadcasting in low resolution NTSC or PAL formats. Recently, some netcasters have been developing platforms for high-definition video. GeoVideo Networks offers a variety of interactive business-to-business, entertainment and educational programming via real-time high-definition video quality Web streams.

Unlike e-cinema, which may take several years until its full potential can be realized, Online distribution and marketing is currently giving independent moviemakers the resources and tools to be successful. Smith states:

> The next generation director now holds the means to control the entire moviemaking process - not simply through production, but through distribution. Nearly every obstacle that the Hollywood system has placed between the filmmaker and his or her audience (including producers, studios, booking agents, distributors, festival directors, and theater owners) is circumvented by the Web (Smith "Forget About NLEs" 60).

Many independents are capitalizing on their newfound control by producing movie shorts and animations. Shorts have always had an important role in the motion picture industry. Numerous high profile directors such as, Steven Spielberg, George Lucas, Spike Lee and Robert Rodriguez got their start in the industry by making shorts. Traditionally they have been used as fill programming for festivals or select cable networks. This is changing as more netcasters use shorts and animations as affordable content options.

One key reason for the demand of short movies on the Internet is their length. By definition, shorts are less then ninety minutes. Home video distributors normally do not purchase shorts because they do not contain enough content. On the Internet, shorts are much more desirable. A feature length movie could take hours to download, while a short may only take a few minutes.

Numerous netcasters display hundreds of shorts ranging from Academy Award winning pieces to thesis projects of unknown students. Most sites have counting capabilities to rank movies according to interactive audience ratings. In addition to audience exposure, some of these movies have been known to win awards at major film festivals and their directors have gone on to sign production deals with Hollywood and independent studios.

One such Net success story is Bruce Branit and Jeremy Hunt's short 405. After spending $300 and three months of post-production work, 405 has become the most viewed movie on the Internet. Being only three minutes in length, part of the success is its ability to be rapidly downloaded. Kevin Windel, CEO of iFilm states: "This is a preview into the future, when two filmmakers can put their film online and reach 2 million consumers without going through the studios or networks" (qtd. in Graham). Word-of-mouth over the Internet helped push 405 to record breaking downloads in just five months. Currently, both moviemakers are working on Hollywood based projects as a result of their Web success.

III. STAINED GLASS: A DIGITAL SHORT

In an effort to be on the forefront of the digital revolution in moviemaking, an independent movie short was shot, edited and mastered using a variety of digital technologies. After careful consideration, the traditional method of using celluloid film to complete this project was deemed financially impossible. Initial cost estimates budgeted the project at approximately $10,000. By using digital production, the idea of telling the same story at a fraction of the cost was more appealing. This project also established the perfect opportunity for understanding the audience's knowledge and acceptance of digital motion pictures.

By choosing a manageable sized short, hands on knowledge could be gained in the different processes involved in creating a motion picture. In turn, the use of digital tools and technology throughout the production were also examined. The following is a discourse about the pre-production, production and post-production stages that took place during the course of completing the creative portion of this thesis.

Pre-Production

Moviemaking as an art form derives from the time tested expression of storytelling. It is for this reason, before any production could take place, pre-production for Stained Glass began with a screenplay. The synopsis for this black comedy is as follows:

Matthew Hazelton is a young man who establishes an offbeat religion in a small Midwestern town. He reaches the masses through a local public access program, which is run by two college students, Valerie and Roman. Finding himself trapped between faith, sin and an obsessed follower, Matthew falls into a "Jesus complex" that eventually leads him into destruction.

The screenplay was written using a digital word processor, during a five-week span in the summer of 1999. By using a word processor, ideas and thoughts could be moved and restructured in a nonlinear fashion. This saved valuable time and allowed for creative flexibility.

Outside of developing the story for Stained Glass, a great deal of planning was given to several important monetary factors during this phase. Because this production is an educational venture, budget restraints were very similar to that of an independent production. Considerable thought was given to the idea of settings, characters, images and sounds.

The most complicated issue was developing a solid story that could be told in less then twenty minutes. Following the methods and standards that are accepted by the professional moviemaking community, the formatting for this screenplay amounted to roughly one page for every sixty seconds of screen time (see Appendix A). After the script was

revised into a second draft and proper approval was granted, pre-production moved forward. The focus was now set on the auditioning of actors, scouting locations, finding a crew, acquiring props and developing blocking.

The auditioning stage centered on finding individuals to play the three principal characters of Matthew, Valerie and Roman. Some form of stage, theater or screen experience background was desired. Nevertheless, it was also important to find individuals who understood personalities that pertain to their central characters. Informative materials and scripts were distributed to selected candidates. Outside of the three lead rolls the story called for an additional nineteen minor roles.

A more relaxed search was conducted in finding the production crew. The crew was made up of graduate students in the Telecommunication Department at Michigan State University. This amounted to finding four dependable students who would assist on the various sets and locations at least two times.

Except for three scenes, all locations were on campus. Keeping in line with the television station setting, the primary location was the student-run television studio in the Communication Arts and Sciences Building. Here, four scenes on six different days were recorded. Single day shoots took place at the student-run radio station, the Student Book Store and the courtyards in front of the auditorium and W.J. Beal

Gardens. For the off campus shoots, two different apartment interiors were used. Additional establishing images were recorded on the downtown streets of East Lansing, Michigan.

Wardrobe and costuming for the lead character was purchased at a local resale shop. The intent was to find bright colors that helped visually represent the eccentric qualities of the self-proclaimed reverend. Props such as a bible, cleaning solution, costume blood and a knife were purchased locally. The complete budget for props and wardrobe amounted to less than $150.

The production budget for equipment was slightly higher. Items such as electrical tape, digital videotape stock, light bulbs and copies of the script were acquired several weeks before production started. A wheel chair, which would be used as a dolly, was reserved for a weekend rental from a local apothecary store. The complete production budget amounted to $360.

The most important step before production was developing a shooting script (see Appendix A). Three rehearsals with the actors allowed for the positioning of character movements and camera placement. From here, every line of action and dialogue was dissected from the script and equated into camera shots. Pages were grouped into scenes and basic storyboards were drawn to give actors a better idea of the pacing and composition.

With the necessary purchases, actors and blocking decided upon, the final stages of pre-production revolved around scheduling and equipment reservation. From here, the project was ready to move into the production phase.

Production

The production phase took place between January and May of 2000. Equipment available through the Telecommunication Department was relied upon extensively. All footage was shot on DVCAM tape using a professional Sony Digital Video Camera. The color bar generator, white balance and timecode features allowed for a high level of manageability. Tripods, microphones, stands, cables, color monitors and lighting instruments were provided from the department as well.

Audio was recorded using either a shotgun or lavaliere microphone. Each microphone was routed into the back of the camera through a balanced XLR connection. Recording in camera allowed for perfect synchronization, as audio was locked to the same internal timecode as the video images. This is one of the financial benefits of recording on digital video, since shooting on celluloid film would require an additional audio recording device and operator. The DVCAM format has two audio tracks and captures digital signals at 44.1 kHz.

Most scenes had only one or two actors speaking on screen at a time and were covered using a shotgun microphone. The generous pickup pattern of the microphone was found to be very useful when a designated audio operator was not present. The microphone was placed on a stand and set slightly off camera in the direction of the actors' voices. The camera operator would then monitor both the audio and visual elements.

The sermons, monologues and selected close-ups of the lead character were recorded using a lavaliere microphone attached to the actor's lapel. Disguising the microphone was not an issue since many of the scenes revolved around a live television setting.

In terms of capturing sound recordings on the sets and locations, many issues were examined before shooting began. Since many of the scenes were shot inside a sound proofed television and radio studio, the acoustics were already conducive to a quality recording. To prevent any unwanted noise, studio lights were not dimmed and the air ventilation system was turned off.

Unlike the sound proofed studios, footage shot in the control room presented some technical problems. To achieve the proper setting, television and computer monitors were left on during the recording. Unfortunately, the fans and picture tubes of these devices created noise and clouded the audio tracks. In retrospect, some form of sound proofing

around these devices or reblocking would have helped diminish this problem.

All other interior locations were recorded in two apartments and the bookstore. Before shooting began neighbors and store workers were notified of the production and were asked to temporarily refrain from creating loud noises. Unfortunately, all three of these locations had refrigerators that generated a background noise. These appliances should have been temporarily unplugged.

Exterior locations such as the courtyards and street curbs presented a variety of sound issues as well. Everyday sounds of motor vehicles, pedestrians, planes, trains, construction and lawn mowers led to many uncontrollable situations. The shotgun microphone was placed in positions that would minimize the recording of these sounds. Also, recording took place in quieter intervals between loud and obtrusive moments. If a recording was interrupted, actors were prompted to repeat a few lines and then continue. The idea was to gain enough clean pieces that could be cut together in post-production which would then give the appearance of one consistent clean take.

In terms of videography, the image quality of the Sony digital cameras offered rich color tones. This was important because the idea of highlighting bright colors in wardrobe and lighting connected with the religious themes and church setting of this piece. Image composition was

usually kept to a straightforward approach. On occasion, the camera angles were lowered or raised in order to accent the dramatic feel of the story.

Scenes shot in the television studio used the traditional three point lighting method, which consisted of a key, fill and back light. This was accomplished by using the 1,000 watt lighting instruments that hang in the studio rafters. Set lights and low power 500 watt lights covered with a variety of colored gels, were bounced off walls and accented onto background surfaces.

In the control room, radio station, apartments and bookstore interiors, one or two source lights from a lighting kit were used. Set several feet away from the actors, these lights were less powerful then the studio lights and were always covered with some form of diffusion in order to avoid hot spots. This also added a softer touch to the image, which accented the dramatic look of the piece. Several low power lamps using 60 watt light bulbs were placed around the rooms. Much like the studio setting, colored gels were put on these lamps to add highlights to the different walls and reflective surfaces.

All exterior shots were recorded on partly sunny or overcast days. Filters were used and the iris was kept at an acceptable level. It was not until after production had wrapped on these locations, that flaws in lighting were noticed. In the courtyard scene, actors' faces were under exposed.

In hindsight, a reflective object placed off camera could have been used to bounce light onto their faces.

The most challenging production element was managing the aspect ratio. This was primarily due to focal length and the size of the rooms. Scenes that were shot inside the apartments, bookstore, control room and radio station were covered using only close ups, over-the-shoulder and two shots. Usually these scenes had to be reblocked in order to capture all of the actors' movements and reactions. In contrast, scenes shot outside and in the television studio had more space for camera placement. This allowed the recording of cover shots, which helped establish the story's locations.

All footage was shot using the single camera approach. The camera would be set in a fixed position, as actors would read through their lines pertaining to a particular scene. Off camera actors would then read their lines for interactive purposes. However, these actors were advised to avoid talking over the on camera performers' dialogue. After each take, the camera would then be repositioned until all shots were accounted for. This method offered a wide variety of coverage and eliminated talk over audio tracks.

Since the camera uses the advantage of a digital format, it weighs considerably less than most analog cameras. The DVCAM tape size is smaller making the claw and cartridge ejection unit more compact. The

battery is lighter since digital cameras require less power for operation. These advantages accounted for hand-held shots that were manageable in terms of steadiness. Portions of the introduction were shot hand-held and required a considerable amount of maneuvering. The low level pan of Roman in the garden scene, the floating pan of Valerie and Matthew in the bedroom scene, the boom of Roman in the final studio scene and the point-of-view of Valerie in the final control room scene, were recorded hand-held (see Appendix A). The cameras mobility also accounted for the two wheelchair dolly shots found in the opening television and radio station scenes.

Post-Production

After production was complete, Stained Glass was ready to move into the post-production phase. This took over a year to complete and presented many challenges. Post-production was categorized into four different stages; tape logging, visual editing, sound editing and final mastering.

During the logging stage, over five hundred minutes of footage was viewed and scrutinized. Since each shot had three to four takes, it was important to narrow down which one would be used in the final cut. Each take was logged by their corresponding timecode cues. Elements such

as delivery and technical competency were factored into the decision making process.

Logging was extremely beneficial to this project because of editing restraints. Though editing was virtually free of charge, the scheduling of time was not unlimited. Drive space was limited and logging helped determine which takes were absolutely essential for editing. Selected footage from the DVCAM tapes was digitized into an Avid Xpress DNLE system at one-seventh the resolution of NTSC broadcast standard. Only after all editing decisions were finalized, could the visual footage be redigitized at a higher resolution. Audio was initially digitized at a broadcast quality rate of 44.1 kHz and kept intact throughout the redigitizing process.

The second stage of post-production was editing. Instead of editing in chronological order, scenes were put together based on their perceived level of difficulty and corresponding settings. For instance, the opening studio scene and the closing studio scene were worked on first since they required more attention in terms of editing. As parts were added to the overall project timeline, these scenes could then be reviewed and recut as needed.

The most challenging aspect of editing was cutting between shots when one or more actors were engaged in dialogue. Timing, pacing and delivery were the major factors judged in developing the proper flow for

each scene. During production, careful consideration was given to the placement of the camera with respect to the three dimensional vectors. In post-production it was important to make the cuts feel and look natural and not diverge from the viewers perception of the x, y, and z axes.

Once a rough timeline of the movie was finished, editing primarily centered around visual continuity. Traditional fades and dissolves were used as transitions between scenes. Working in nonlinear fashion, these effects were very easy to adjust and maintain. One of the benefits of nonlinear editing is the fact that the original digitized clips are never actually altered. Instead, these clips are worked on within a timeline. The timeline is a representation of the actual media and can be changed an infinite number of times without ever touching the original.

The only digital effect used outside of fades and dissolves was color correction. Adjustments in contrast, tone, hue, luminance and brightness were applied to approximately thirty percent of the project. Here, individual shoots with drastically different appearances were altered to match surrounding footage. In some instances, the levels of surrounding footage were lowered or raised in order to match the odd looking shots. By using these two methods, image and lighting quality became consistent throughout the overall piece. Color correction was also used to highlight the church and stained glass lighting design set forth in the production stage.

For the opening sequence, color correction was used as a visual special effect. In contrast with the lighting design, the color footage was changed to black and white. Brightly colored text was then masked over the sequence and placed in the four corners of the screen. The text was made using Adobe Photoshop and imported into the storage drives at full resolution. By inverting the alpha channel, the text retained its glowing outer edges and could be manipulated without effecting the repressed image or alpha layers. The graphics were then faded in and out by adjusting the luminance levels of their internal key frames.

Unlike the opening graphics, closing credits were made using the title tool software that was included with the Avid Xpress. This tool was used because of its vertical roll functionality. By using three different layers, text could be manipulated into a professional layout. The first layer of text contained character names and crew positions. This was placed on the left side of the screen and aligned to the right. Next, the actors' names and members of the crew were placed on the right side of the screen and aligned to the left. Finally, the headers were added and the three layers were realigned. Once rendered, the rolling text was centered vertically, which is the most common credit layout.

During the visual editing stage, audio was tweaked slightly and amounted to only short fades and minor volume adjustment. Sound effects that were recorded on location were also integrated into the project

timeline. The audio at this stage was mixed internally using only four tracks. The first three tracks were designated to each of the three primary actors with an additional track for sound effects and extras. This mix was only temporary since its primary purpose was to accommodate the visual elements of the timeline. However, the mix established a foundation for the sound editing stage.

After four months, the visual editing of the project was complete. A minute of color bars with reference tone and a ten second countdown were placed on the head of the completed timeline. The visual footage was then redigitized at the highest possible resolution and outputted to analog Beta SP tape. The four tracks of audio were exported using the Avid's Open Media Format (OMF) to a removable Jazz disk. By using the OMF protocol, the audio files could then be opened in a Fairlight MX3+ digital audio workstation.

Now that the visual elements were finalized, post-production moved into the sound editing, rerecording and mixing stages. Once the OMF audio files were imported into the Fairlight, the video portion of the project was digitized into an independent drive at a lower compression ratio. Image quality was not an important issue at this point, since the visual elements were projected onto a large screen and used for monitoring purposes. The drive was then linked to the Fairlight's controls. This negated using a tape based machine and the time consuming shuttling

and rewinding that is inherent to that type of setup. By synchronizing the audio and visual countdowns that were created before the export, the image was locked to the audio with pinpoint precision.

A majority of the dialog and effects clips exported into the Fairlight were altered through an equalization process. Similar to the color correction applied to the visual elements, dialog was adjusted in proportion to their surrounding tracks. For some scenes, high end hiss or low end rumble was diminished, while others simply needed adjustments in pitch, tone and level. Several fades and cross fades also began to take shape at this time. In addition, effects were applied to the dialog tracks by a device that was separate from the Fairlight. These effects were accomplished by routing the DAW's output through the attached mixing console. Once complete, these new clips were then digitally rerecorded into the Fairlight.

Several hours were spent logging sound effects from a prerecorded CD library. These professional effects were digitized into the Fairlight and placed within the project timeline. Many of them were used to accompany sounds that were already recorded on location, while others were added to enhance the overall sound track. Many of these sounds were recorded in stereo and added a heightened sense of reality to such things as cars passing and birds chirping in the background.

Unfortunately, not all of the sound effects for this project were found in the library. A foley session was needed to complete such sounds as footsteps and splashing liquid. Different floor textures and clothing were used to create the ideal results for these effects. A production assistant generated all of the foley used in this project. A microphone was placed near the sound source, while the assistant synchronized their movements to the visual elements of the project. This was ideal for many of these effects, since the proper timing was important to the natural feel of sounds.

It was decided that some of the lead actor's lines would need to be rerecorded in order to eliminate distortion that happened during the actual production phase. Six lines were reduplicated using a technique known as Automated Dialogue Replacement (ADR). Similar to the foley session, the actor stood inside a sound proofed chamber with a headset and video monitor. Each segment was then replayed again and again as the performer synchronized their voice with their lip movements. Each take was recorded digitally into the Fairlight. Though the results from the ADR session improved the overall sonic qualities of these lines, there was a slight loss in terms of performance. The actor's delivery suffered since much of their attention was focused on synchronization and not their inflections.

Between the visual and sound editing stages of this project, an original song was recorded and produced. After reading the script for Stained Glass, singer Shannon Drypen wrote an original song titled, Follow Me. On the initial session, a four track demo of the song was recorded using one track of vocals, one track of acoustic and two tracks of electric guitars. This demo laid the foundation for further musical development.

Analysis of the demo fostered the decision to slow the piece down and add additional instrumentation. After Drypen recorded new acoustic and electric guitar tracks, keyboard arrangements were then added and bass player, Michael Stork, recorded a rhythm track for the piece. This gave the song a religious element and connected well with the theme and setting of movie. Finally, Drypen's vocal segments were added along with three different backing chorus tracks. Though the sixteen tracks were initially recorded on high quality analog tape, the final mix was digitally outputted into the Fairlight.

In addition to the song Follow Me, several pieces of original music were produced for the score of this movie. Each piece used straightforward rhythms and was created with a drum machine and keyboard synthesizer. The score was composed and cut to the actual picture, which allowed the musician to develop changes in rhythm that highlighted suspenseful moments within the scenes. The music was

edited in a separate DAW system using Protools software. Once completed, the different pieces were recorded to CD, digitized into the Fairlight and incorporated into the projects timeline.

For the final mix, the Fairlight was routed to a Yamaha O2R console. This console allowed for adjustments in panning, overall levels, additional effects and routing placement in the four channel Dolby Surround Sound field. Clips were relocated to one of the twelve tracks designated for the final mix. Each track was then routed into one of four channel positions; front left, front center, front right and surround. The first three tracks were primarily talk and dialog and designated to the center channel only. At the same time, light compression was placed on these tracks in order to create headroom and boost their overall levels. The fourth and fifth tracks were used for mono sound effects and were assigned to the center channel as well. The sixth track was a third mono sound effect track but was assigned to both the front center and the surround channel. The seventh and eighth tracks were designated for stereo effects and were assigned accordingly to the left and right front channels. The final four tracks were designated for all music and background effects such as, radio announcers, wind, birds and cars. The ninth and eleventh tracks were assigned equally to the front left and surround, while the tenth and twelfth tracks were assigned to the front right and surround.

After listening to the stereo and surround mixes, the audio portion was now ready to be mastered. Here the mixing console was routed digitally to both a DVCAM tape deck and a recordable CD player. Through the console, levels for all twelve tracks were kept at a constant volume while the Fairlight played the timeline. At this stage, only three manual maneuvers were performed to the mix, consisting of two effects and a fade.

From here, the two audio tracks from the DVCAM tape were inserted onto the Beta SP master that housed the visual elements. By using a linear editing system, the audio tone was realigned with the countdown at the head of the master tape. At this time, the visual elements on the master tape were inserted onto the video track of the DVCAM tape. This created both a digital and analog master copy of the finished movie. The Dolby Surround was encoded within the two master audio channels. By using an encoding process, the surround sound can then be transferred to any digital or analog presentation format using a compatible decoding receiver.

IV. EVALUATION

To better understand the creative achievements and use of digital technology in my thesis, three showings of Stained Glass were conducted during the month of April 2001. At the showings, the movie was presented to the participants on either digital DVCAM or analog VHS video tape. Each participant was asked to voluntarily fill out a survey (see Appendix B). This survey was a mixture of quantitative and qualitative questions designed to elicit valuable feedback on the movie's content, aesthetics and use of digital technology. A total of 34 participants, ranging between the ages of 20 and 65, completed and returned the survey. Of the participants, 14 were personal friends or a relative of the movie's director, while the remaining 21 had an unbiased connection to the project.

Audience

The first six questions focused on discovering the audiences' knowledge of digital production and independently produced movies. The idea was to gain insight into the audiences' viewing habits and related activities that may harbor wide spread interest in these types of productions.

For the first question, participants were asked if they had ever seen a movie short other than Stained Glass. A total of 62% of the audience

had viewed a movie short. This relatively high percentage may indicate that movie shorts have established an entertainment presence in our society. It also points to the increasing number of shorts currently being produced by independent moviemakers.

The audience was then asked if they had ever viewed a project shot on digital video. At least, 25% of the audience indicated that they had, while 17% had not. Strikingly, 58% of the participants were unsure about their answer. This may indicate the audiences' lack of knowledge or interest in this subject matter. For the second part, participants were asked to list the title of any digital movies they had seen. Only 20% of the people responded. Their titles included; Video Antics At Work, Bamboozled, Glove, CKY2K, Timecode, The Sucker, Take Care Frank and Chance.

The next questions referred to the audiences' use of World Wide Web. The results showed that 65% of the participants had accessed the official site of a movie. This relatively high percentage may point to the recent increase in movie related sites. The audience was then asked whether they had ever downloaded or watched a movie on the Internet. At least 62% of the audience had never engaged in this activity, while 38% of the audience had. Of those who downloaded a movie, 30% watched a feature, 63% watched a movie short and 7% watched a trailer. The significant amount of movie shorts being downloaded reinforces the

technical limitations of the current Internet.

The next question asked whether they had ever attended a film festival. A total of 41% had attended a festival while 59% had not. If the number of film festival attendees were higher, this would indicate a greater level of exposure to shorts and digital movies. Instead, it may represent the audiences' lack of interest in these types of venues.

Finally, questions were included to gain insight into their viewing habits of non-Hollywood movies. The movies categorized included independent films, movie shorts, animated films, experimental films and documentaries.

Movie shorts was the lest popular of the five categories. No one was classified as an avid fan and only 9% watched them often. While 44% watched occasionally, 42% indicated that they never watch. As few as 6% of the audience members were not familiar with the movie shorts category.

Experimental films were the second least popular category. Only 3% of the audience indicated that they were an avid fan. However, 59% stated that they watched experimental films occasionally, while 29% marked that they avoid movies in this category.

Only 3% of the audience indicated that they were avid fans of independent films. While 21% said that they watched non-studio produced movies often, over 53% watched occasionally. As few as 18%

indicated that they never watch movies of this type.

The second most popular category was animated films. While no one was considered an avid fan, 24% watched them often and 56% watch them occasionally. However, 21% had indicated that they never watch animated productions.

The most popular category was documentaries. At least 29% of the audience marked that they watch documentaries often, 65% watch occasionally, with only 6% stating that that they never watch. Despite the popularity of this category, no one indicated they were an avid fan.

Overall, this audience seemed to be responsive to movies that fall outside of the traditional studio setting. Though they may lack in-depth knowledge on the latest digital production techniques, they seemed aware of alternative outlets for watching movies and are relatively open minded to a variety of motion picture experiences.

Production Quality

In the next section, participants were asked to use a five-point scale to rate nine different production elements. For the audiences overall impression of Stained Glass, 32% rated it excellent, 53% marked above average and 15% rated it average. Sound quality received the highest marks, with 53% rating it excellent, 44% choose above average and only 3% rating it as average. Music followed, with 47% rating it excellent, 38%

rating it above average and 15% rating it average.

In terms of image and picture quality, 38% rated it excellent, while 56% choose above average and 5% marked average. Editing received a favorable rating, as 88% marked excellent or above average and 12% marked it as average. Lighting was awarded similar marks, with 40% choosing excellent, 48% rating it above average and 12% stating that it was average.

The following areas received some of the lowest overall rates. Only 26% of the audience thought that the wardrobe was excellent, 29% rated it above average, 41% rated it average and 3% marked it below average. Since this movie was made for approximately $500 and the wardrobe was purchased from local resale shops, this was not unexpected. Acting was slightly higher, with 23% stating that it was excellent, 50% choose above average, 23% marked average and 3% choose poor. The graphics and text received the lest favorable rating with only 21% marking it as excellent, 44% marking above average, 29% rated it as average and 3% said that it was below average.

The audience was then asked an additional series of questions to give insight into any actions they might take after viewing the movie. A total of 59% said that they would definitely watch Stained Glass again, while 50% said that they would recommend it to a friend. Only 44% percent indicated that they would log on to this movies web site. In

regards to the song Follow Me, 53% indicated that they would like to hear it again, 41% said that they would tell a friend about the song and only 29% indicated that they would download the song from the Internet.

Creative Feedback

The final ten questions of this survey focused on evaluating Stained Glass as a creative endeavor. This movie can be categorized as a black comedy or drama with dark and comical undertones. Despite the fact that Stained Glass can also be labeled as independent or digitally produced, it is how the audience reacts to the movie's content, that is ultimately responsible for its success.

Several questions asked the participants which aspect of the movie was most interesting. The areas of setting and dialog received the lowest ratings with 9% each. Some audience members felt that the dialog was believable and helped keep the story flow. Others stated that the setting of a television public access studio added to the movies overall realism.

Only 24% of the audience felt that the theme was the most interesting aspect of Stained Glass. People commented favorably regarding the movie's cynical views, while others connected with the themes of redemption versus punishment. Stained Glass was written to reflect a variety of themes dealing with love, religion and personal behavior.

The plot received the second highest rating. At least, 26% of the audience thought that the situations in the story were unique, while others simply enjoyed the dramatic aspects. The most widely held opinion was in regards to plot twists. Many commented on how they were caught off guard by the story, which in turn held their interest. The viewing audience felt that the ending was the most compelling aspect of Stained Glass, stating that it brought a richer element to the overall story.

The characters received the highest rating with 41%. Most of the comments were on character interaction. Others thought that they were unique and even comical at times. The audience was asked which one of the three main characters was most interesting. Over 62% favored Roman. Many were intrigued by the way religion corrupted him, while others said that he was unpredictable and they tried to predict what he was going to do next.

Even though 34% of the audience choose Matthew as the most interesting, many had a considerably strong reaction to him. Comments revolved around the unsettling psychological elements associated with his personality. A large portion of the audience felt that Matthew was hypocritical and essentially the story's villain. The audiences' connection with Matthew may be due to the fact that he was in 85% of the movies scenes. In terms of communication objectives, the audiences' opinion is positive. Matthew's character was written to evoke emotion and

accommodate plot twists.

Valerie's character received the least favorable response. Over 74% of the audience found her uninteresting, while only 9% found her as the most interesting. Many people stated that she was a "damsel in distress" and lacked the development found in Roman and Matthew. Some felt that she was manipulative, while others suggested that she served as a connection for the other two characters' struggle. These opinions are warranted since the story did not accommodate a substantial character development for Valerie, as she was presented more as a reactionary.

The final set of questions allowed the audience to elaborate on the actual story elements. Instead of asking specifics, short answer questions were used to evoke qualitative comments.

Overall, the audiences' opinion of Stained Glass was high. 85% of the audience thought the story was clear and well thought out. Virtually everyone stated that the ending was the strongest aspect of the movie and that it added depth. However, the idea of Roman taking over Matthew's role was also listed as an area of confusion. Consequently, many felt that the way Roman got away with Matthew's murder was not stated clearly and did not understand the significance of two years in a mental hospital. These points may have needed further development since many felt that they dispelled belief.

The audience also suggested that the movie was too short. By telling this story in less then twenty minutes, character development suffered. This can be viewed as both a positive and a negative critique. The fact that people would like to learn additional background on the characters indicates a strong level of plot interest. This movie should have probably been a feature length film, where stories and character development would occur over an additional seventy minutes.

Finally, the audience was asked about their reaction to the religious elements of this story. Over 59% of the audience said that they were spiritually guided with 83% choosing some form of Christianity as their primary religion. This story centers on a preacher who develops a blasphemous Christian faith. Despite this fact, no one in the audience stated that they were offended. Instead, they felt that the religious elements were secondary to the story's plot and theme. Many stated that the tones were somewhat comical and not to be taken seriously. The majority felt that religious aspect made an intriguing backdrop for the different characters portrayed in this student production.

CONCLUSION

The art of producing motion pictures is in the midst of a digital revolution. Not since the introduction of sound or color has the industry seen such drastic changes to this time tested craft. This is even more apparent, as digital processing replaces the long standing tradition of using celluloid film to shoot, edit and distribute movies. New technologies such as high-definition video, nonlinear editing and digital projection, are rewriting the methods and approaches used in creating movies. In turn, the digital revolution is changing the overall business models of both the studio and independent aspect of the industry.

As distribution moves from a film based system to a digital one, many independent moviemakers are beginning to transcend the financial barriers associated with producing a high quality product. It is unlikely that the studio system will crumble at the hands of the independents. However, exhibition windows such as e-cinema, digital film festivals, netcasting and video-on-demand promise to ignite the theatrical sector and create new distribution avenues for both parties. This may also reinvent the way we watch movies, as interactive content enters into the delivery process.

The financial implications of the digital revolution have also given way to new pre-production, production and post-production capabilities. Once thought of as privileged fields, the technology of digital imagery and

sound have expanded into several affordable and user-friendly applications. These applications are apparent when the production of Stained Glass is examined. Whether you label this movie as independent, amateur, low-budget or student produced, it is important to remember that the quality of this movie would have been extremely difficult to achieve just a decade ago. Almost every aspect of this movie from writing, directing, shooting, editing and sound design were completed using some form of digital technology. The end results are truly amazing, as Stained Glass offers such digital enhancements as surround sound, color corrected images and computer generated text. Audience opinion reflects this view, as the technical aspect associated with the above mentioned areas received the most favorable ratings in the evaluation of this movie.

Several conclusions can be drawn in the study of the digital production landscape. Many feel that the digital shift was brought about simply because of monetary reasons. Others argue whether the end product of digital film will be of lesser quality. These conclusions are similar to the change that the digital revolution brought to the music recording industry. Comparisons are still being made between high-definition video and celluloid film. In light of numerous debates, one aspect that will never change is the storytelling ability of the medium. No matter how efficiently a movie is produced, the end results still must offer

a vast array of artistic depth. Beyond the technical achievements of Stained Glass, complex characters immersed in plot twists and profound themes were the real reason for its success. Though the performance aspects of the acting and directing may have been aided by digital technology, the results are something a computer could not create. It is for this reason, that digital practitioners still need to use calculated judgment when developing such integral components as image composition, editing, lighting, set design and acting. By combining these skills, a motion picture creator must ultimately understand the movie's communication objectives and use the medium to properly evoke a vast array of emotion. If practitioners continue to hold these values close, the digital revolution will reach far beyond those involved in the moviemaking process. For it is not the producer, actor, editor, cinematographer or even the director who has the greatest to gain from the digital revolution. Ultimately it is someone much more important; the audience.

APPENDIX A

APPENDIX A

"STAINED GLASS"

FADE IN:

EXT. CONVENIENCE STORE - DAY

CLOSEUP on MATTHEW HAZELTON, a 23 year old college dropout who slicks his hair back and wears glasses in a desperate effort to make himself look older and more respectable. He also smokes a cigarette for this same reason.

Matthew sits on a concrete curb, in front of an empty parking space, next to the store's entrance. Matthew's shoulders are hunched over as his eyes fall into a dead man's stare.

MATTHEW
(to the camera)
Preaching is in my blood! My mother's father, as well as my father's brother, were both successful minister's of faith. In fact both my cousins are currently the head pastors at my folks church down in Calsberry Kentucky. However, preaching is not what they had in mind for their only son.

Two young girls walk by. For a moment, Matthew breaks his stare and looks at their firm behinds as they pass. He takes a hit on his cigarette.

MATTHEW
Fortunately, I have had the strength as well as the intuition to surpass my parents
(MORE)

MATTHEW (CONT'D)
parental shortcomings. After three years of studying and reading nonsensical books, I now have realized that a college education was not in my destiny. You see, I have recently opened my eyes to the common man's plight. We all live and breathe in the same exact manner, and in this day and age we need a belief system that has been set forth with how we live and breathe in mind. A belief system for the flawed! A year ago today I started a new kind of faith. Maybe you have heard of it? It's called The Holy Church of Solicitous Redemption. Not only does this church have a small and loyal following, but I have a very successful television program on this fine community's cable system.

DISSOLVE TO:

INT. PUBLIC ACCESS STATION - TELEVISION STUDIO - NIGHT

A sign on the studio door reads: TCA CABLE SYSTEM/CHANNEL 52, TELEVISION FOR YOU AND ME.

With one stroke, a hand fades a lever into the up position on the lighting board.

As the studio lights cast forth their intense light, Matthew stands in the center of the studio. There are long strings of decorative silver paper hanging behind him. To his right, sits a table with a bible on it.

ROMAN BLAKE, a heavy set 25 year old, zooms a television camera into a medium shot of Matthew.

The television camera has a large Teleprompter screen attached to it's nose and Roman wears a headset.

After Roman finishes his zoom and locks the camera in place, he steps away from the television camera and intently listens to Matthew as he begins his sermon.

MATTHEW
(to Roman's camera)
Listen to me carefully people. You can not live in this world just by observing every little facet of it. Day after day you sit there in your homes watching the violence on the news, being to unfocused to go out and try it for yourself.

As Matthew AD LIBS, Roman is taken away from his diligent observation of Matthew by a voice ringing through his headset.

VALERIE (O.S.)
Roman pay attention! He'll be moving to the table any second now. Get ready to follow him.

ROMAN
(into his headset)
I'm not sure I remember exactly how to do that exactly Valerie.

VALERIE (O.S.)
Damn it Roman! We went over this a hundred times. Just keep him in the frame.

Roman looks on with a sense of great fear in his eyes.

MATTHEW
Do what is needed to live.
(MORE)

MATTHEW (CONT'D)
Desire, lust, greed. Feel all your impulses. Don't let your conscience rule you. Last night, while I was cleaning my kitchen, the good Lord spoke to me. He said Matthew, tell the people how to live. Tell them to experience everything, so that when they get to the afterlife they will be able to make a decision on what is right and what is wrong.

As Roman tries desperately to keep him within the television cameras sight, Matthew walks over to the table next to him and picks up a copy of The Bible.

Matthew opens the book and rips out a page.

MATTHEW
In this book there are Ten Commandments. They are from a time that has past. Last night God told me to throw them away as they serve no real purpose in our lives anymore.

As Matthew crumples up the piece of paper in his hand, Roman looses control of his television camera. As the Teleprompter on the camera's nose begins to tip forward, Roman frantically tries to hold it in place.

SMASH CUT:

INT. PUBLIC ACCESS STATION - STUDIO CONTROL ROOM

Through a large sound proof window, VALERIE THOMAS, the program's attractive looking director, and BOB ASKY, the program's sound man, watch Roman as he lets the camera's nose fall forward.

The bank of television monitors, that moments ago were displaying Matthew's face, now display his feet.

VALERIE
(into her headset)
Roman do something!

Roman looks at her through the large window with a desperate plea, while we HEAR Matthew AD LIB his sermon through the control rooms speakers.

VALERIE
God damn it Roman! Bob get ready to cue the ending music.

Valerie pushes a lever on the control board. The show's ending graphics take the place of Matthew's feet on the television monitors. RELIGIOUS MUSIC cuts Matthew's voice off.

VALERIE
And... Fade to black.

Valerie pulls down a large lever. The MUSIC FADES out.

As Valerie takes off her headset and throws it down in disgust, we SEE Roman through the window, walk over towards the control room door. Matthew forcefully follows behind him.

Roman and Matthew enter the room.

MATTHEW
What the hell happened out there Valerie? Why did you cut me off?

VALERIE
The Teleprompter on Roman's camera knocked his lens down.

Matthew looks at Roman with absolute rage.

ROMAN
(panicking)
I'm sorry Matthew. I got so into what you were saying...

VALERIE
It's not Roman's fault Matthew. That prompter has been doing that ever since I started working here.

MATTHEW
I don't care. I'm sick of this fat-ass dragging this show down. Do you have any idea how many people were tuning in tonight to watch my preaching.

Across the room Bob bursts out laughing.

BOB
Five.

MATTHEW
Oh, keep it up funny shit and I'll fire your ass too.

Bob regains his composure.

VALERIE
How can you fire him? This is volunteer. We don't even get paid!

MATTHEW
Get the hell out of here Roman!

Roman looks at Valerie. She responds with a helpless look.

MATTHEW
Leave!

Roman walks away as though his world has fallen apart.

EXT. CAMPUS - COURT YARD - DAY

Valerie sits on a park bench. She is reading a magazine and eating an apple.

As Roman walks up, his large shadow covers her face.

VALERIE
Oh! You startled me for a second.

ROMAN
I'm sorry. I didn't mean to bother you Valerie.

Roman turns around.

VALERIE
No that's okay Roman, come and sit down.

Like a little child who just received a piece of candy, Roman sits down next to Valerie.

ROMAN
I just wanted to thank you for sticking up for me yesterday.

VALERIE
Listen, if it's any consolation I think Matthew is a complete jerk. He shouldn't have fired you. Sometimes he takes this whole thing way to seriously.

ROMAN
No, he doesn't. You see it's okay. I realize now that Matthew's right.

Roman pulls out the bible that Matthew tore the page out of earlier.

ROMAN
You know I've been going to church and reading the bible ever since I was a little boy. I hated ever damn minute of it because it made no sense. But when I hear Matthew speak something deep down inside of me tells me that I should listen. When he talks, the little hairs on the back of my neck stand straight up.

VALERIE
You've got to put this in perspective, Roman. Matthew had no right to treat you that way.

Roman looks down in shame.

ROMAN
You do believe that what he says is true? I mean he has to be right. He says it from the heart, Valerie. I think he was sent down here to save us all.

VALERIE
(laughing)
Save us! I don't know about that. Sometimes he makes sense but sent here from God, that is taking it way to far.

Roman looks away in embarrassment.

VALERIE
Look Roman, I didn't mean to
(MORE)

VALERIE (CONT'D)
make you upset.
(pause)
I think it's really sweet the way you look up to him. I bet if you tell Matthew how much this all means to you he'll let you work on the show again.

Roman smiles. Valerie gives him a hug.

ROMAN
Hey, Matthew is preaching right now over in the south quad. You want to come with me.

VALERIE
I have class...

Roman's face turns sour.

VALERIE
All right, I'll go for a little bit.

Valerie gathers her things and they walk off together.

EXT. CAMPUS - SOUTH QUAD - DAY

A wooden sign leans on a park bench. The sign reads: THE HOLY CHURCH OF SOLICITOUS REDEMPTION; A CHURCH FREE FROM REDEMPTION.

Matthew sits on top of the park bench as a CROWD of ten people stand around him.

Valerie and Roman walk up to the crowd. Valerie looks up at Matthew.

MATTHEW
Every single religion says the same thing. God loves you.
(MORE)

MATTHEW (CONT'D)
God cares about you. You are one of God's children. He is our father. If this is true then let me ask you one simple question. Can God sit by and watch us burn in hell forever? Can God condemn his own child, created in his image, to eternal pain and suffering? The answer is no.

Matthew notices Valerie in the crowd. As their eyes make contact, Valerie blushes.

MATTHEW
The New Testament states that Jesus saved us from hell and gave us salvation. But that was two thousand years ago. I have been brought here today to save us from the dawning of a new hell. There is no devil or sin in this new hell, only our minds. It stems from a conscience that has been programmed into our heads since the day we were born.

As Valerie becomes consumed with what Matthew is saying, two irate CROWD MEMBERS step forward.

CROWD MEMBER #1
You're full of shit, man!

CROWD MEMBER #2
Who do you think you are? Your sure as hell not Jesus!

ROMAN
Listen to this man.
(MORE)

ROMAN (CONT'D)
He was sent here to save us all.
He is a messenger of God.

Matthew gives Roman a scornful eye.

Several crowd members turn their heads away in disgust. Roman notices that several people begin to walk away. Roman tries desperately to run after them.

MATTHEW
Now hold on here. I think you see this all wrong. We have been interpreting what Jesus said inaccurately. It is stated in the Proverbs that we are not to covet sin but openly bestow it. Tomorrow night, at 8:00 on Channel 52 will be the greatest moment of religious inspiration you have ever had. I pray that you will tune in.

As Matthew steps down from the park bench he notices that Roman and Valerie are the only people left.

VALERIE
(steps forward)
Wow! You know, I've never really listened to what you had to say before. That was great!

MATTHEW
Thanks. I'm glad someone was paying attention.
(looking over)
What's he doing here?

Matthew points at Roman.

VALERIE
Roman's the one who brought me here. Look Matthew, He's really upset about the other day. I am asking you to please let him come back to the show.

Matthew looks at Roman and then at Valerie.

VALERIE
You should listen to the way he talks about you. He really looks up to you.

MATTHEW
All right... okay.

Valerie's face is delighted as Roman smiles.

VALERIE
See, I knew you weren't that mean. I'm late for class, I'll talk to you guys later.

Valerie waves good-bye to Roman and gives Matthew a seductive stare, as she walks off.

ROMAN
See you later Valerie.
(turning to Matthew)
She's a great girl isn't she?

As soon as Valerie is out of sight, Matthew turns to Roman with a face full of rage.

MATTHEW
How can you be so goddamn stupid?

ROMAN
What did I do?

MATTHEW
I had those people eating out
of my hand until you opened
your fat-ass mouth.

Romans face turns to complete shock.

MATTHEW
I don't care what Valerie says
there is no way you are ever
coming back to work on the show.

Matthew pushes Roman out of the way as he walks away.

Roman is left standing alone.

INT. PUBLIC ACCESS STATION - STUDIO CONTROL ROOM

Matthew sits at the control console. He intently writes in his notebook.

CLICK, as the bank of television monitors in front of him turns on. Snow covers the screens, as STATIC blasts from the control room speakers.

On the far left screen an out of focus IMAGE appears.

IMAGE #1
Nor have I come of myself,
but he sent me!

CLOSEUP on Matthew as he stops writing.

MATTHEW
(calling out)
Who's in here?

Within seconds, another IMAGE appears on the top screen.

IMAGE #2
The works of God should be
revealed in him!

Matthew's eyes look around the room but there is no one to be found.

A third IMAGE appears on the far right screen.

IMAGE #3
If you were blind, you would
have no sin!

MATTHEW
(calling out)
Is that what you wish?

All three IMAGES turn and look directly at Matthew.

IMAGES
(together)
Those who do not see may see
and those who see may be made
blind?

Matthew closes his eyes.

MATTHEW
Give me strength Lord.

A hand reaches out and touches Matthew's shoulder.

VALERIE
Matthew, are you okay?

Matthew puts his hands up and opens his eyes. As he looks up, he notices that the televisions are all off and there is no static coming from the speakers.

Matthew is breathing hard.

VALERIE
Are you all right?

MATTHEW
I think so.

VALERIE
What happened? I heard you yelling from the hallway.

Matthew looks down and notices his papers laying all over the floor.

MATTHEW
Nothing... I must have been dreaming or something.

VALERIE
Odd! Anyway, I was wondering what you were doing tonight?

MATTHEW
I was going to work on my sermon for tomorrow night.

VALERIE
Well, I don't have anything to do and I thought that maybe you would like to take me out to dinner.

Valerie gives Matthew a seductive smile.

MATTHEW
I don't know...

Valerie kisses Matthew on the lips.

MATTHEW
What was that for?

VALERIE
For letting Roman back on the show.

Matthew smiles.

VALERIE
So where are you taking me to eat?

EXT. VALERIE'S APARTMENT - DAY

A pair of shoes walk past a parked car.

INT. VALERIE'S APARTMENT - BEDROOM - DAY

Valerie has her arms around Matthew as they lie asleep in her bed.

FOOTSTEPS are HEARD from outside.

Valerie's eyes open.

As the FOOTSTEPS stop, We HEAR a loud KNOCK at the door in the other room.

Valerie gets out of bed and puts on a robe. Matthew's eyes open.

VALERIE
Go back to sleep. I'll see who it is

Matthew irritably rolls over.

INT. VALERIE'S APARTMENT - LIVING ROOM - DAY

Valerie turns the corner and walks to her front door.

As she unlocks the dead bolt and opens the door, a blast of bright sunlight shines onto her face.

A disheveled Roman stands on the outer side of the door.

ROMAN
Valerie I don't know what to do. I've been up all night crying!

VALERIE
What's a matter Roman? What happened?

MATTHEW (O.S.)
Who is it Valerie?

As Roman looks up, Matthew turns the corner from the bedroom.

ROMAN
You slut! I can't believe you slept with him.

Roman starts to cry and runs down the stairs towards the parking lot.

VALERIE
Roman wait!

Within seconds, We SEE Roman running through the parking lot below Valerie's front door.

Matthew steps towards Valerie and shuts the bedroom door.

MATTHEW
The kids a head case. Don't beat yourself up over it.

VALERIE
I don't want to hurt him.

Matthew chuckles.

MATTHEW
He's the type of guy who would stalk you Valerie. It's for the better.

CLOSEUP on Valerie's discouraged face.

DISSOLVE TO:

EXT. CONVENIENCE STORE - DAY

Matthew sits on the same curb that he sat on earlier. He also smokes the same cigarette.

MATTHEW
(to the camera)
It's not my goal to piss off Valerie. But come on man, Roman's an idiot. You can not become great by surrounding yourself with incompetent beings!

As his cigarette burns down to it's filter, Matthew flicks it onto the ground.

MATTHEW
I envy religions and churches that fall onto tragedy. People like those cultists' down in Waco, Texas and those southern churches that are constantly being burned down. It forces people to become interested, take charge and stand behind something. Tragedy, throughout the generations, in any shape or form leads to martyism. And martyism my friends, leads to greatness.

Matthew stands up and brushes himself off.

MATTHEW
It's like the end of a movie when the music fades in and the credits roll. You're left with the whole movie cumulating to that single point. It puts closure on the whole experience.
(MORE)

MATTHEW (CONT'D)
It allows you to walk away and say "that story really made me think" or "that movie changed my view of the world"! Tonight, when my sermon's over and the music fades in and the credits roll, that is exactly how the world will see me.

Matthew turns around and walks into the convenience store.

INT. CONVENIENCE STORE.

Matthew walks down the first isle and picks up a bottle of lime cleaning solution.

Matthew steps up to the front counter and places it down along with a five-dollar bill.

The store CLERK behind the counter, looks up at Matthew.

CLERK
Is that it for you today, Sir?

MATTHEW
Yes.

INT. RADIO STATION - ON AIR ROOM - DAY

The on air room has a large console with chairs and microphones all around it. Through the studio windows We SEE a ENGINEER controlling the audio board.

Matthew sits next to the news director of the radio station, JOEL CHAKIEN. The ENGINEER cues Joel

JOEL
Were back on 89 FM The Impact's Exposure.
(MORE)

JOEL (CONT'D)
Sitting next to me is local Televangelist, Matthew Hazelton. His program titled "The Holy Church of Solicitous Redemption Hour", can be seen on our own local public access channel 52. So Matthew, tell our listeners a little bit about this very unique church that you have started.

MATTHEW
Well, first off Joel, I would prefer that you call me Reverend Hazelton.

Joel gives Matthew an annoyed look.

JOEL
Okay, Reverend Hazelton, tell us about your church.

SMASH CUT TO:

INT. ROMAN'S APARTMENT - KITCHEN

CLOSEUP on a radio. We HEAR Joel's radio program coming from the speakers. Joel and Matthew AD LIB.

As THE CAMERA pulls out WE SEE Roman standing in front of his kitchen counter. The front door to Roman's apartment is in the b.g.

There is a KNOCK at the front door. Roman does not respond. Within moments the handle begins to turn back and fourth. A loud THUD is heard.

VALERIE (O.S.)
Come on Roman open up. I can hear the radio. I know you're in there.

Roman just blankly stares at the empty wall.

A second THUD is heard.

VALERIE (O.S.)
Roman I'm sorry. I didn't mean to hurt you. You just have to understand.

Roman continues to stare at the wall.

MATTHEW (O.S.)
This new hell exists in our minds.

JOEL (O.S.)
What about heaven?

MATTHEW (O.S.)
If people follow my teachings I will show them a new heaven inside themselves.

A third THUD is heard.

VALERIE (O.S.)
Roman I'm giving up. I hope that you can forgive me.

Roman continues to stare at the wall. We HEAR Valerie's footsteps as she walks away.

JOEL (O.S.)
So what your saying is that we should listen to you for moral guidance?

MATTHEW (O.S.)
I am not setting the law only freeing the mind. Think of it in these terms. If something seems morally right to an individual who are we to say that they are wrong.

Roman opens counter drawer. Inside there are several large kitchen knives.

JOEL (O.S.)
Even if it's a crime?

Roman's hand reaches for the biggest knife.

MATTHEW (O.S.)
Even if it's a crime.

Roman looks at the knife as it's shinny reflection shines up onto his face.

INT. PUBLIC ACCESS STATION - CONTROL ROOM - NIGHT

As Matthew looks over his notes, in the b.g. Bob and two new assistants, MARTY and SETH finish getting the show ready. They are doing odd production jobs such as testing microphones and white balancing the camera's.

Valerie walks into the room.

VALERIE
Who the hell are these guys?
Where's Roman?

Matthew very slowly sets done his notes and looks up at Valerie.

MATTHEW
Roman is a waste of space, Valerie. These guys are our new assistant.

VALERIE
You said that you were going to let Roman work on the show again.

MATTHEW
I lied.

VALERIE
Well I quit! Good luck running your show tonight without a director.

MATTHEW
I already foresaw that problem. Bob is the shows new director.

Valerie gives Bob a scolding look. Bob turns his head away in shame.

VALERIE
You, Bastard!

MATTHEW
(laughing)
We both did exactly what we wanted. I got rid of Roman and you got to sleep with me. And as you know, in my book that's all that matters.

Valerie slaps Matthew's face and then storms away. After a few moments, Matthew regains his composure.

MATTHEW
(calling out)
All right gentlemen, lets make television history.

INT. PUBLIC ACCESS STATION - TELEVISION STUDIO

With one stroke, a hand fades a lever into the up position on the lighting board.

As the studio lights cast forth their intense light, Matthew stands in the center of the studio. On the table next to him sits the lime solution.

Seth operates the television camera in front of Matthew.

MATTHEW
Welcome to The Holy Church of
Solicitous Redemption.

EXT. PUBLIC ACCESS STATION - NIGHT

A pair of shoes step onto the walkway in front of the station.

INT. PUBLIC ACCESS STATION - CONTROL ROOM

Bob sits in front of the switcher board as Marty mans the audio board.

As we HEAR Matthew AD LIB through the control room speakers, Valerie steps into the control room unbeknownst to Bob and Marty.

INT. PUBLIC ACCESS STATION - STUDIO

MATTHEW
Ever since I started this
church twelve months ago, I
have been completely devoted to
a life without redemption.

Matthew addresses the television camera.

MATTHEW
You see God does not need to
redeem me of my sins because
only I can do so.

INT. PUBLIC ACCESS STATION - HALLWAY

A pair of shoes stop their stride as they pass the junction where the studio and control room meet.

INT. PUBLIC ACCESS STATION - STUDIO

MATTHEW
Yesterday, while I was working on tonight's sermon, the good Lord spoke to me. He repeated a passage from John nine-thirty nine which tells of Jesus' meeting with the blind man.

INT. PUBLIC ACCESS STATION - CONTROL ROOM

We HEAR Matthew AD LIB through the control room speakers, while Marty and Bob continue to man their operating boards.

Valerie quietly sneaks to the lighting board console that sits off on the right side of the room.

MATTHEW (O.S.)
Jesus says that within the blind man the works of God shall be revealed.

As she reaches the board, Valerie looks out through the large sound proof window.

In the window, we SEE Roman as he enters the studio.

INT. PUBLIC ACCESS STATION - STUDIO

CLOSEUP on Roman's face as he stands to the right of Matthew. His eyes are locked in an engaging stare.

MATTHEW
Tonight! Right here, right now. I will administer one of the ultimate forms of sin onto my own body.

Matthew's hand grabs the lime cleaning solution.

INT. PUBLIC ACCESS STATION - CONTROL ROOM

In the b.g., we SEE that Bob notices Valerie.

BOB
(standing up)
Valerie! What are you doing?
Get away from there

As Valerie's hand extends above the master light switch, Bob runs over and pulls her back.

Valerie tries desperately to break free of Bob's hold.

INT. PUBLIC ACCESS STATION - STUDIO

Matthew holds the now open bottle of lime solution above his head.

CLOSEUP on Romans intense eyes.

MATTHEW
I hold here in my hand a bottle
of lime because I am not scared
of sin! God has told me that
only I can be the judge of what
is right and what's wrong for me.

INT. PUBLIC ACCESS STATION - CONTROL ROOM

Valerie swings back and forth in Bob's arms, as she tries desperately to escape.
INT. PUBLIC ACCESS STATION - STUDIO

Roman pulls out the knife from inside his coat. His eyes are fixed on Matthew as if he were his prey.

MATTHEW
God said that those who do not
see may see and that those who
see may be blind.
(MORE)

MATTHEW (CONT'D)
As I stand here ready to pour this blinding chemical into my eyes, one way or the other, I'll make you see the Lords way.

As Matthew tilts his head back, Roman steps in front of Seth's television camera.

INT. PUBLIC ACCESS STATION - CONTROL ROOM

Valerie kicks Bob in the groin, as she finally breaks free from his hold.

INT. PUBLIC ACCESS STATION - STUDIO

Matthew's eyes grow wide, as he notices Roman and the knife within his hand.

MATTHEW
What are you doing you fat-ass?

As Roman steps forward, Matthew steps back and bumps his hand against the table.

The lime cleaning solution falls towards the floor.

SERIES OF SHOTS

A) Roman raises his knife

B) Valerie pushes the master levers down on the light board console.

C) The open bottle of lime hits and splashes all over the floor.

D) The studio lights go black.

INT. PUBLIC ACCESS STATION - CONTROL ROOM

After a moment, Bob jumps up from the floor and quickly pushes Valerie away from the board.

As Bob turns the light back on, CLOSEUP on Valerie shocked eyes as she looks at the studio floor.

INT. PUBLIC ACCESS STATION - STUDIO - HIGH ANGLE

FROM ABOVE, we SEE Matthew's bludgeoned body. He is sprawled out on his back surrounded by blood.

THE CAMERA PULLS OUT to reveal Roman kneeling next to Matthew's slain body.

Valerie quickly runs up next to Roman.

Valerie stands in complete shock, as Roman puts his hands over his whimpering eyes.

DISSOLVE TO:

EXT. CONVENIENCE STORE - DAY

Roman sits on the same curb that Matthew once sat on. His appearance is drastically different. He is clean shaven, his hair is styled and he wears a sport coat and slacks. There is a bible in his right hand.

Roman lifts his sunken head.

ROMAN
(to the camera)
Sometimes I ask myself why I did what I did. I mean, I know my lawyers were telling everyone it was because of my childhood and all the medication I've taken throughout the years. But that's not why.

Roman looks off to his right for a moment.

ROMAN
Two years... two years in a hospital is a long time for a man to reflect on who he really is. Especially when they keep probing and asking you all sorts of questions. But that whole time I kept hearing the calling to carry on the preaching of a new kind of faith. Now this is not your ordinary faith. No, this faith is for the common man. A belief system for the flawed. Maybe you've heard of it, it's the Holy Church of Solicitous Redemption. I'm sure you have, it has an extremely loyal following. In fact, I'm preaching tonight on a local television show. You should tune in, I can guarantee it'll be something you won't forget.

Roman turns around and walks into the convenience store.

FADE OUT.

THE END

APPENDIX B

APPENDIX B

Survey Form

1. Stained Glass is considered a short. Have you ever viewed a movie short before?

   YES | NO | UNSURE

2. Instead of using film, this project was shot on digital video. Have you ever watched a movie other then Stained Glass that was shot on digital video?

   YES | NO | UNSURE

   a. If yes, please list the movie titles:

   _____
   _____
   _____
   _____

3. Have you ever accessed the official Web site of any movie?

   YES | NO | UNSURE

4. Have you ever downloaded or watched a movie on the Internet?

   YES | NO | UNSURE

a. If yes, was this movie feature length or a short? _____

5. Have you ever attended a film festival before?

   YES | NO | UNSURE

6. Mark the viewing habit that represents your feelings towards the following movie categories:

	Avid Fan	Watch Often	Watch Occasionally	Never Watch	Do Not Know
a. Independent films	___	___	___	___	___
b. Movie shorts	___	___	___	___	___
c. Animated films	___	___	___	___	___
b. Experimental/art films	___	___	___	___	___
e. Documentaries	___	___	___	___	___

7. Please use the five-point scale listed below to rate Stained Glass:

5 = excellent
4 = above average
3 = average
2 = below average
1 = poor

a. Your overall impression of this movie: _____

b. Sound quality: _____

c. Image or picture quality: _____

d. The overall acting: _____

e. Music: _____

f. Graphics and text: _____

g. Lighting: _____

h. Wardrobe: _____

i. Editing: _____

8. For these questions, please mark the criteria that best fits your opinion:

	Definitely	Maybe	Unlikely	Never
a. I would watch this movie again?	___	___	___	___
b. I will recommend this move to a friend?	___	___	___	___
c. I would log on to a Web site about this movie?	___	___	___	___
d. I would like to hear the song "Follow Me" again?	___	___	___	___
e. I would tell a friend about the song "Follow Me"?	___	___	___	___
f. I would download "Follow Me" from the Internet?	___	___	___	___

9. Which of the following aspects did you find most interesting?.

Plot Characters Theme Dialogue Setting

a. Why?_____

_____

_____

10. Which character did you find the most interesting?

Matthew Roman Valerie

a. Why?_____

_____

_____

11. Which character did you find least interesting?

Matthew Roman Valerie

a. Why?_____

_____

_____

12. What did you like most about this movie? Please explain.

_____

_____

_____

13. Was there anything you disliked about this movie? Please specify.

_____

_____

_____

14. Was any element of the story confusing or unclear? Please explain.

_____

_____

_____

15. What was your opinion of the theme or plot of this movie? Elaborate.

_____

_____

_____

16. What are your thoughts on the ending of this movie?

_____

_____

_____

17. Do you consider yourself a religious or spiritually guided person?

YES | NO | UNSURE

a. If yes, what faith do you practice? _____.

b. Explain your feelings towards the religious element of this story?

_____

_____

_____

18. Additional comments on Stained Glass:

_____

_____

_____

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