Forensic Virtual Models in the Courtroom-An Introduction
by Eugene Liscio

Over the years technology has pushed the evolution of demonstrative evidence to the point where it can effectively bring the events of an accident or crime scene to the jury. Understandably, the pace of change has been slow, but even today most lawyers and accident reconstructionists are familiar with 3D forensic animations and have come to expect them in certain circumstances. There have been some articles written on the subject and most lawyers (especially those who deal with vehicular accidents) know that proper use of such a persuasive tool can often influence the outcome of a settlement or trial. Some have embraced the technology and have used it personally in litigation and others are still apprehensive about the idea. Nonetheless, technology marches on and presents alternate and advanced ideas that need to be explored. One such idea is the use of Forensic Virtual Models.

Forensic Virtual Models (FVMs) are the next evolution of forensic animations in litigation. They can be best explained as the migration of 3D content (i.e. the data used to create a forensic model or animation) into an interactive application with a real-time graphics visualization engine. Unlike regular video, film or forensic animations which are passive (i.e. the user sees only what the animator wants to show), FVMs are viewed in real-time and the user can interact with the animation by moving the camera view in the scene as the animation is playing. The visualization engine may allow for smart links and object intelligence so that when the user gets close to or interacts with an object, it can react in a pre-specified manner.

There are many parallels between forensic animations and 3D FVMs. They both have a very similar initial development process, both are driven by the computer gaming industries, and they are governed by similar rules of admissibility. However, a main distinction between the two is that a forensic animation is a passive visual experience whereas the FVMs offer the user a dynamic and immersive experience which is parallel to modern day video games.

Unfortunately for some, any mention of the gaming industry tends to provoke negative thoughts for use of the technology in litigation. Ironically, the same software used to create some incredibly creative and extraordinary games can also be applied to an industry where the creed is adherence to the facts. However, the gaming industry is responsible for driving some of the most stunning advancements in 3D visualization technology used in the medical, military and training simulation industries. During the late 1990s when forensic animations began to grow in use, there were similar arguments against this tool due to the prejudicial nature of this form of demonstrative evidence. Today, most of these issues are better understood and have been overcome by a better educated industry.

For lawyers, even more important than the technological advancements is the value that a 3D virtual model brings to the courtroom. Whenever a tool can be used to help better clarify facts in a persuasive, immersive and interesting nature, a jury is more likely to pay attention. Facts are more likely to be remembered and it may be easier to understand the key points of the presentation. An example for the use of an FVM would be a case where a large crime scene involving various persons inside a building had taken place. Instead of presenting a large number of drawings and sketches, a lawyer could do a virtual walk through of the entire crime scene at his/her own pace, entering different rooms and clicking on important pieces of evidence to trigger subsequent events. A forensic animation would also help to visualize the scene, however the control of the presentation is now in the lawyer's hands and not predetermined by the footage in the animation or drawings. A lawyer could easily move to a part of the scene, inside or outside that perhaps needs further clarification which only enhances his presentation.

Click here for a YouTube link demonstrating a simple 3D virtual model.

The development process for a FVM is similar to a forensic animation. The difference is in the back end and delivery. The diversion between the two technologies occurs at the point where the scene is ready to be "rendered". Rendering is the process of calculating each frame of the animation. This would be the final step (excluding any video editing) for a forensic animation. However, a FVM requires that it be packaged in a self-contained viewer and requires some programming to make the scene interactive. The amount of programming is simply a factor of what the lawyer or client wants it to do.

From a cost perspective, both a forensic animation and FVM are similar depending on a number of factors. Many articles have been written on the cost factors associated with forensic animations and all would be more or less applicable to the FVMs except for where the two development processes diverge (i.e. from the end of the scene preparation onwards). The programming portion of an FVM and any subsequent inclusion of text, links, actions, etcetera will all be incorporated into the programming step. Delivery of the final FVM can only be viewed on a computer and not on a DVD player.

Another simple example is the use of 3D forensic models such as a damaged vehicle. The vehicle could be recreated and displayed as a virtual model such that the lawyers, accident reconstructionists, opposing counsel and the jury can all inspect the vehicle as if a scale model were in the palm of their hands. Of course, having the real piece of evidence for inspection would be the ideal situation, but there are clearly limitations to the size or nature of evidence being brought into court. In some cases, the evidence may have been destroyed, deteriorated over time or is simply unable to be handled (such as medical data captured in CT or MRI scans). In each of these cases, the FVM plays an excellent role.

As with any novel technology, there are new factors which must be taken into account in the courtroom. A traditional forensic animation is passive and fixed so that all parties know exactly what will be shown. The animations are reviewed by each side in a court case and the expectations as to what will be shown are known. In the case of a complicated FVM, the entire presentation needs to be well planned with a clear objective and strategy beforehand. One could conceivably become lost in a complicated presentation and any errors in this type of evidence could quickly become apparent by the jury or opposing counsel.

FVM of a patient made from CT and MRI data.
The model is completely rotatable and features can be magnified for closer inspection.

There is also the question of admissibility. Although one could argue that FVMs are nothing more than watching a video from several user controlled perspectives, the interactivity of the FVM could be made out to be prejudicial in nature depending on the circumstances. The opposing counsel may not be aware of the intent, and could raise objections to any surprises during the course of the trial. When in doubt, it is best to follow the same rules and strategies of admissibility as for any piece of demonstrative evidence. It is imperative to reveal the nature and intent of the FVM well in advance of trial so that opposing counsel has an opportunity to review the evidence.

Of course, there is some explanation and instruction required into the use of the technology for both sides in litigation. Since it is not as simple a matter as pressing "play" on a DVD player and is more of an immersive experience, opposing counsel must be involved so they can explore and become familiar with the FVM and its proposed intent. Preparation of how to implement and display this new technology into a court strategy is key to a successful presentation.

One must always weigh the value that technology brings against the challenges that may be presented. In some instances, it does not make sense to use technology for the sake of technology. However, as lawyers and accident reconstructionists continue pushing towards dynamic presentations of video, text, documents and other forms of evidence, it seems Forensic Virtual Models will become a very effective alternative to the sketches, drawings and photographs traditionally used to portray demonstrative evidence in the courtroom.

Eugene Liscio, P. Eng. is the President of AI2-3D Animations based near Toronto, Ontario (Canada). Eugene is a registered engineer in the province of Ontario and actively promotes the use of forensic virtual models, animations, photogrammetry and other visual solutions for the courtroom. He has written several articles on forensic visual technology and has recently launched a forum with articles and informative resources to assist clients in understanding and making informed choices. For further information, please e-mail Eugene at eliscio@ai2-3d.com, visit the AI2 website at www.ai2-3d.com or forums at www.ai2-3d.com/Forums.

We asked two trial technology ASTC-member consultants to respond to Eugene Liscio's article on Forensic Virtual Models. On the following pages, Laura Rochelois and Brandon Colburn share their reactions.

Laura Rochelois comments on:

Forensic Virtual Models in the Courtroom (by Eugene Liscio)

Laura Rochelois [lr@bydesignlegal.com] is a principal at By Design Legal Graphics, Inc., a full-service courtroom graphics vendor serving a national client base from its offices in San Francisco and Portland, Oregon. For more information on By Design Legal Graphics, Inc., see http://www.bydesignlegal.com.

The novelty of FVM is "real-time". The ability to modify and interact with 3D visual assets in the moment is exciting and could prove to be very beneficial. If properly applied, the technology has the potential of making the process of developing visuals both more efficient and more effective. Better, faster and cheaper, pick three!

For instance, FVMs could become a useful tool upstream in our process to generate and guide discussion, get ideas on the table and enhance the productivity of visual strategy sessions. FVM could also be used as a rapid prototyping tool, not unlike those common in product design to generate a short list of initial options in a cost effective manner. Such tools both open up the discussion and then quickly help provide focus. When it is all said and done we may wind-up with a single POV and visual storyline at trial, but having different vantage points available in real-time without added cost represents a great improvement over traditional forensic animations.

FVM can also improve upon physical models in many instances. Flexibility, time and cost come to mind. Physical models have the characteristic of being tangible and "real" and certain circumstances will call for them. This trade-off will have to be evaluated on a case by case basis.

Finally, the author indicates that FVMs offer a more immersive experience for the audience. I don't think that is necessarily true. The interactive and dynamic qualities of this technology are appealing but the risk of distracting from the content and being off-putting to the audience must be kept in mind. Don't let the gizmo take over the stage! Remember that the audience experience drives design choices, not the presenter experience.

In closing. I think this is a promising technology. It has a time and a place in the process and can improve both how we go about our work and enhance the impact of visual information at trial. But it is also only that, a technology, and the benefits will be realized from our selective application of its capabilities.

Brandon Colburn responds to:

Forensic Virtual Models in the Courtroom- an introduction
By Eugene Liscio

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Remember the days when 3-dimensional virtual reality and "holodecks" were nothing more than the fantasy of Star Trek fans? That technology has long since been developed and has recently proven to be a viable, cost effective tool in forensic investigation as well as a powerful weapon for litigation. As with most technology, it took time for 3D animation to gain a foothold in the legal system, but what's next?

The average juror is not an expert in medicine, engineering, physics, or law; by design, they come from all walks of life. What they do have in common is the expectation of being dazzled with compelling evidence and graphic demonstrations as seen on popular television. This phenomenon of expectation is so common it has been dubbed 'The CSI effect'. Modern people (aka potential jurors) choose to learn using the Internet and television, so why then does our legal system try to teach them using lecture, argument, and outdated blowups?

In post trial interviews, jurors agree that properly executed trial presentations are more credible than the average expert witness (and will probably cost you less). Most litigation consultants have seen glassy eyed jurors slouched over, fighting testimony-induced sleep, suddenly lean forward and pay attention to a simple 3-D model or animation. The interactive experience of these animations provides entertainment AND education; satisfying the modern juror's expectation of visual stimulus while effectively persuading them.

Forensic **V**irtual **M**odels simply take 3D animation a step further offering users mobility during the presentation.   You can take the court on a guided visual tour of any scene from any angle: a vehicle, an intersection, a construction site, or an office building can all be re-created digitally and programmed to demonstrate various information from a multitude of angles. While previous generations of 3D animation followed a scripted path, these new FVMs provide the flexibility of a user-controlled experience. You can now 'choose your own adventure' each time you present it, making the legal applications endless.

With great power comes great responsibility, and with any new technology the versatility of the new forensic virtual model must be weighed against the cost and uncertainty of its execution. A complex case will require a very complex model and many hours of practice are necessary (with both the attorney/user and the programmer/digital consultant) before a seamless presentation can be made in front of a jury.

Due to the technology's relative infancy, a forensic virtual model is probably a bit out of reach for most legal applications. The cost is still too high to add enough additional "bang for your buck", but FVMs are the future; just like basic 3D animations were ahead of their time five years ago.   New technology becomes less expensive, more advanced, and accessible as time passes.

Mr. Liscio writes, "…it does not make sense to use technology for the sake of technology." However, some cases *demand* a 3D animation just to be fully understood by the layperson sitting in the jury box. When you have triable issues of fact that hinge on mechanics of movement, medical injuries, laws of physics, etc. you need to think long and hard about how you will deliver your strategy to the jury. As the application matures, the Forensic Virtual Model should become an extremely valuable tool for litigation.

Eugene Liscio responds to Laura Rochelois and Brandon Colburn:

Most people believe that the costs of FVMs are generally too expensive. However, they are in the upper range of what one would normally pay for a high quality forensic animation. The cost of presenting in a courtroom comes down to a modern day laptop computer and a video projector. Of course, there needs to be an investment in "handling" the FVM and preparing a presentation strategy.

FVMs are an extension of forensic animations brought on by modern day video game technologies. They should not be confused with "virtual reality" where participants wear special goggles, gloves and a body suit. FVM technology is in fact, quite mature, but its use in legal settings is not. There needs to be some consideration about how this form of technology is adapted and presented in the courtroom and how it will be admitted as demonstrative evidence. I believe Laura Rochelois makes a good point about "generating discussions". This is a much understated point! There are two extremely valuable benefits of FVMs that are less emphasized by most authors, yet, they are most apparent in practice.

1. Getting it Right

After having handled an FVM, it is not uncommon to find that an attorney or expert witness will change his/her position on some points since it becomes clear that something did not happen the way it was originally anticipated. There are also circumstances where blatant errors and miscalculations are found after having handled a FVM. This often saves attorney or expert witness from an embarrassing situation during trial and provides a perspective to something closer to the "truth".

2. Taking a Second Look

A second benefit of a FVM is that different scenarios can be considered. Since one can easily experiment with different assumptions, evidence and variables, areas of strength can be emphasized and areas of weakness can be better defended. This also helps to raise important questions for the attorney to ask the opposing counsel. It is a question of preparedness that all too often gets overlooked due to any number of reasons.

The visual check provided by having a user controlled perspective in real-time is where the true value of a FVM comes out. The process of going through and analyzing a FVM means an attorney is engaged in valuable discussions and is better prepared to face any unexpected scenarios which may arise in court.

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Thanks for looking at the July 2008 issue of TJE. This month we are pleased to bring you not only diverse but international perspectives. This issue of The Jury Expert has authors from England, Canada, and all across the United States.

This time we're all about witness preparation, the eye witness research literature, a new 'secret weapon' for ensuring your witnesses remember facts as accurately as possible, religion in the jury box, case themes, a new form of forensic animation, and understanding RSS without any real work on your part. Plus our July 2008 "favorite thing" is hidden away inside.

We appreciate the feedback you've given us and are eager for more! Tell us what you think or what you'd like to see in The Jury Expert by simply sending an email to the Editor.

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