Computer Animation and Simulation in the Courtroom

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The Case

Antonino Schepis, in his late 40's, an experienced tractor trailer operator, was driving an 18 wheel tractor-trailer combination loaded with 42,000 pounds of Ralston Purina animal food. Having picked up the loaded trailer at the Ralston Purina plant in Dunkirk, New York, Schepis was heading for his company's food distribution center, in West Seneca, New York.

Before accepting the load he examined it, observing that the trailer was packed full with shrink-wrapped animal food bags on pallets stocked up in two layers against each wall with what appeared to be a space down the middle. He noted only that the last row seemed close to the doors and made a mental note to let the warehouse people know, lest they open the doors too quickly without checking for a rearward load shift which might cause the goods to tumble out.

Taking the New York State Thruway, Schepis drove East toward Buffalo, New York, where he exited at Route 400, known as the "East Aurora Expressway." The exit ramp is a long upward sloping single lane which culminates in a curve to the right which is marked with a suggested speed of 25 mph. At the point of intersection this becomes a third eastbound lane in the expressway, with two opposing lanes of traffic separated by concrete "Jersey" barriers.

On the exit ramp Schepis downshifted twice and then once more just as he reached the right-hand curve at the top. He testified that he was proceeding in the way he had normally negotiated this turn over several years with similar loads. On this day something quite different happened.

Midway through the turn at a speed which he believed was around 25 mph or less, the entire rig began to roll over to the left, trapping a small passenger car beneath the tractor and the front portion of the trailer. The truck's momentum carried it forward until it came against the barriers on top of which the car became wedged, flattened between the overturned truck and the top of the jersey barrier. Immediately the car caught fire.

Schepis was able to scramble out of the tractor, now turned on its side, and the driver of the passenger car was able to get out of his window. He and those who quickly stopped to help were able to also pull out his 14 year old son who, by this time, had burns over 40% of his body. From the car screams were heard. There the driver's wife, five months pregnant, and daughter remained, crushed and burned to death.

Although the tractor was equipped with a "tripmaster" which would have made a record of the speed of the vehicle at tenth-of-mile intervals, it was totally consumed by the blaze which engulfed the wreckage. Investigators at the scene quickly concluded that Schepis was not under the influence of any controlled substances or alcohol. Despite evidence of mechanical failure in the tractor's front right leaf spring hanger, the State Police investigators concluded that the overturning of the truck was attributable to excessive speed in attempting to negotiate the turn.

One State Trooper estimated that the speed of the vehicle must have been 41 mph, and a retired Calspan (formerly Bell Aerospace) engineer, frequently utilized by attorneys in Western New York for purposes of accident reconstruction, concluded that the tractor must have been going 40 mph at the time it overturned, relying upon what he considered to be skid marks on the roadway and his own computations of the rollover speed for a tractor-trailer of this configuration and load.

Schepis was charged with the felony of criminally negligent homicide, and a number of traffic violations relating to excessive speed and failure to reduce speed around a turn. Of course the case also resulted in a substantial civil claim against the trucking company and the driver.

At the very outset we knew that we needed engineers who were familiar with the dynamics of tractor-trailer rollovers. We were convinced that the estimates offered by the prosecution witnesses were greatly exaggerated, because of enthusiasm on the part of the police investigator and inexperienced with tractor-trailer dynamics, on the part of the prosecution's

accident reconstruction engineer. But we were also convinced that a mere competing static model of rollover speed would neither be sufficiently persuasive nor able to account for the changing variables over time which we felt contributed to this accident.

This case also had a substantial, but certainly not overwhelming, number of documents, and so it presented an ordinary opportunity to automate the process of indexing and sorting the relevant documents and exhibits.

As it turned out, the Schepis case provides a good example for the study the use of the computer simulation and animation, as well as the more typical "litigation support" function of automation of the management of documents. It has been reported as the first use of a true computer simulation in the defense of a criminal case.

I. Computer Animation

Computer Animation is becoming more common in the courtroom largely because of the evolution of CAD (Computer Assisted Drafting) software on the personal computing platform. These programs allow the litigator to take a number of steps forward in the use of demonstrative evidence in the courtroom by creating an apparent three dimensional model of a relevant scene. Elements of the scene can be moved to represent or correlate with what did happen or may have happened on an earlier occasion or the camera perspective may be changed to give a different view.

The role of the computer in the animation process is to allow precise scalar reproduction of distances, angles and size that can be easily replicated from scene to scene as the elements of the model are moved. In the best of these programs, for example, a bullet trajectory shown entering a room on one side would proceed to the correct point on the opposite wall, no matter what perspective was chosen for the camera angle.

Thus, apart from being equivalent to a series of artist's renderings of a scene or course of events, the computer animation also has the advantage of following certain rules of geometry in the construction of these models.

This capability makes it easier for the artist to make numerous frames, 15-30 for each second of time, which preserve geometric integrity and objects are moved or the perspective is changed. This suggests greater reliability than a draftsman rendering, and yet the purpose is the same: to illustrate facts or testimony which might be more difficult to understand without the assistance of the computer model.

What is finally seen in the courtroom is, however, not a computer or the immediate output of the computer, but a videotape which contains the frame after frame of graphic images generated by the CAD program.

As with all demonstrative evidence, CAD animations are useful because they help the witness or the lawyer tell the story better.

A. Technical limitations

1. Virtual Reality?

Our expectations about computer animations may be greater than justified. We have seen, either in futuristic programs (like "Max Headroom" or "Star Trek") "real time" computer applications which allow the computer operator to zoom from infinity down to the microscopic level and rotate 360° around an object, again pulling back to any distance. This is called a "virtual reality" environment.

Such a capability is not fantasy: it can be done and has been done. A great deal of work is being done in the area of "virtual reality" especially in computer games, flight simulators, and so on. At this point, however, such "virtual reality" engines which allow interactive and real time modification of a scene on a computer monitor are not right now ready for courtroom use. No doubt such a capability is not far from being able to be economically implemented in the courtroom, but it is not here yet, and it provides substantial evidentiary challenges.

As a result, computer animations (and even computer simulations), discussed below, will not typically be able to play out "What if . . .?" scenarios, at least not in the courtroom.

The program can always be redone, but this means physically redoing all the relevant images. If thirty frames are used per second it may take two minutes or more to generate each frame, meaning it would take 30 hours to generate one minute of videotape of the simulation. Obviously, changes can not be made quickly to the output.

Because computer simulations are "rule based", they are susceptible to "what if" scenarios which can be worked out relatively quickly, but they are also subject to the same time limitations in terms of the graphic

rendering process.

2. Locating a computer animator

The use of computer generated images on television, in marketing, advertising, publishing, trade exhibits, engineering, architecture and museums is becoming so commonplace, that it should not be difficult to find an enterprise capable of doing a good computer animation for the courtroom. The demands of each case may be different, calling for different talents or experience on the part of the animator, including familiarity with the various components of the scene and the equipment necessary to make the proper measurements, etc.

Those with forensic experience will more readily understand the need to fully document the construction of the models and the factual assumptions made, and to justify the manner in which objects are located or manipulated from frame to frame.

There are forensic animation services sprouting up in every major metropolitan area the country providing one with dedicated forensic animation services. They will be able to provide examples of their past work and references.

Much of the time it will be possible to "cultivate" a graphic artist or draftsman into a forensic animator, but in most cases it will be well worth it to pay for experienced forensic animators.

3. Lead time

The decision to use forensic animation of any type must be made early on so that adequate time can be given to both the expert witness, if any, and the animation team to gather the information necessary and to construct the computer model.

4. The continuing role of the attorney

The attorney should be prepared to be involved at every stage so that unanticipated problems can be addressed before they affect, and ruin, the entire presentation. It cannot safely be assumed that even the most experienced animator will fully understand the theory of defense or anticipate every harmful or objectionable element which may be considered for inclusion.

5. Mastering and preserving the physical evidence

Photographs of a scene or some police cartographer's diagram will not provide sufficient information to create a computer model. Arrangements will have to be made for direct access by the forensic animator to relevant buildings or vehicles or locations so that direct on-site measurements can be made. This can not often be done one or two months after the events, when buildings might be demolished, bullet holes patched up and windows replaced.

6. Cost

Even though the cost of producing forensic animations has dramatically reduced in the past few years, the cost will still be substantial and there will be a wide range of choices in terms of quality. However, with many people entering the field, there should be a lot of competition for business and there are many firms which have the capability of doing forensic animation which perhaps are interested in getting into the area.

Still, commercial production of a helpful animation which meets up to standards one would expect for admissibility of such evidence will probably start in the $5,000 range.

7. The presentation

When thinking about computer animation it is important to think through to the trial process itself and ensure that you arrange for the equipment necessary to provide display for all relevant parties: the judge, prosecution, defense counsel, the jury and witnesses. This requires the purchase or rental of high resolution monitors and an appropriate video players with a junction box that will deliver output to each monitor.

Anticipate that copies of the video tape will probably have to be provided to the prosecutor and the judge for examination and for introduction into the record. An extra copy should be maintained in the event that it is requested by the press, colleagues, etc.

B. Evidentiary issues

1. Is it "cumulative"?

One objection which has been raised to the use of animations in the courtroom is that the process of laying a foundation for the animation itself renders the animation "cumulative", and therefore unnecessary evidence. Surely the litigator who has conceived of the need for forensic animation in a particular case will not have any difficulty in articulating how the narrative testimony falls short -- because of limitations of narrative or limitations

imposed upon the witness' perspective -- of telling the entire story.

The ability of the computer animation to coordinate to known points in time or geographic locations or geometric relationships exceeds the ability of a witness or a series of witnesses to tie their observations to elements of the scene of which they may not have been aware at the time that events occurred.

Thus, the objection that the evidence is "cumulative" or "bolstering" should be anticipated and even emphasized in the original preparation of the computer simulation. The lawyer who thinks ahead about the limitations of the narrative or physical evidence available in the case will be able to focus in on the precise features of the case which can be best demonstrated by the forensic animation. If that was done in conjunction with the forensic animator, then those features can be properly emphasized in the animation.

2. Drawing the line

The worry on the part of many judges and attorneys is that computer assisted drawing in the courtroom can be misleading for the jury and that subjective elements, not having a foundation in the evidence, might be introduced in the animation. One promotional video tape for an animation service directly talks about the persuasive effect derived from how the presentation is structured. The listener is not aware of how the structure of the presentation affects their evaluation of its content.

The attorney has to be aware of those production techniques used to bias the viewer, both to challenge loosely founded animations, and also to control his or her own animator from the temptation to make the presentation more persuasive than the facts allow.

For judges, I believe that the concern is also that the same arguments which go to the admissibility of computer assisted animation might be used to justify the use of a "docu-drama" reenactment of the events by professional actors on video tape with all the emotion and perspective and subjective qualities that such a presentation could introduce. That too could be described as "useful" and as a "better expression" of the facts than the defendant would be capable of articulating. Even if such factors are not remotely presented in a computer animation, judges will naturally be thinking about where the line can be drawn between computer assisted drawing and the equivalent of a TV "mini series."

Surely the line has to deal with the directness of the connection between the computer assisted drawing and the physical evidence in the case. Beyond that, should the proponent of the evidence be bound to establish that the depiction is more than merely consistent with the evidence? Must it be "true" or "highly probable" as an account of the events, given the very real possibility that the jury will give it more weight than it deserves?

On the one hand, defense lawyers might fear that if they attempt to raise the standard of admissibility for the prosecutor, they raise it for themselves. I have argued elsewhere that the standards for admission of favorable defense evidence can not always be as rigorous as that for evidence offered by the state.[2] But, practically speaking, judges often feel that what is good for the goose is equally good for the gander. And I anticipate that the defense is most likely to want to offer animations which are expressly *not* considered to be "true" but merely expressions of how many different animations could be constructed that are "consistent" with the facts and yet inconsistent with the prosecution theory or the prosecution animation.

Nevertheless, we are bound to run into animations which are, to quote Michael Kennedy, "bad science" concealed under slick packaging. The trial lawyer has to be prepared to recognize and attack such materials from the very beginning.

On a more ritualistic level, judges, as do most of the public, continue to think of the presentation of evidence as being essentially narrative. Many judges are more forward thinking and actually appreciate the extent to which demonstrative evidence can make the trial process more efficient and intelligent. But many judges will continue to think that the "old fashioned way" is superior and that others must be suspect.

3. Notice required?

Under New York State's Criminal Procedure Law the defense is required to give notice to the prosecution of any scientific procedures or physical examinations, the results of which it intends to use at trial. Although it is arguable that computer assisted animation does not literally fall within that definition, it is obviously the wiser choice to give notice to the prosecution well in advance of trial so that a claim of surprise can not be utilized by the judge to exclude

valuable, and very expensive evidence.

4. Foundation

As noted before, the forensic animator should be prepared to lay a thorough foundation for the computer programs used to create the animation and the facts and assumptions upon which he or she relied in creating models, scenes, and rendering the image.

It might be wise to have available certain "benchmark" demonstrations of the ability of the program to accurately solve geometric puzzles using the built-in CAD tools, just the same way that "calibration" evidence is offered with respect to Radar and Breathalyzer machines.

5. Application

In our tractor-trailer case, one of the issues upon which we focused was the possibility that the load had shifted at the time the truck entered the fatal turn. Anecdotal evidence established that, upon unloading similar loads in the past, the upper pallets on one side or the other of the truck were collapsed over to the other side, owing to the aisle left down the middle of the truck when the pallets were loaded up against the opposing walls of the trailer.

Ralston Purina maintained data on the precise dimensions of pallets containing certain types of products, each determined by the size and quantity of the food bags placed on each pallet. Additionally, for each load, there was a diagram maintained of what product was loaded and where. This was originally used to provide information to our engineers needed to calculate the center of mass. However the dimensional information allowed us to challenge testimony of Ralston employees to the effect that there was "no space" between the pallets when loaded.

Using the prescribed dimensions of the pallets we constructed a mathematical model of the loaded truck and were able to determine the exact spacing between the pallets and the average space (about 14"). When visualized in an animation, this would graphically present the jury with a view of the inside of the trailer.

This dimension was later incorporated into the simulation we conducted when we tried to determine the possible effect of a shifting of the load on the "rollover speed" of the rig.

II. Computer

Although the *output* of a computer simulation can look exactly like a computer animation there is a fundamental difference between the two.

In an *animation*, although aided by a sophisticated computer drawing program, the forensic animator essentially draws an event or a series of events. A computer *simulation* begins with a computer program which is capable of applying all of the relevant laws of physics to computer models constructed within the program using the facts of the case, or experience-based scientific premises applicable to the events.

The simulation, although it may finally be presented through a computer assisted rendering, basically incorporates a complicated mathematical model with numeric output. That output is then translated into graphic images which incorporates the output of a series of computations.

Thus the computer simulation is more factually based than an animation. Although an animation also requires a detailed construction of replicas of the objects and places that are relevant to the case, the simulation must go farther. It must account not only for the outward appearance of objects but in their other physical attributes, such as internal structures, mass, friction, and so on.

The computer simulation is also based upon certain premises which have a basis in the experience of the scientific expert involved. For example, in the case of a tractor-trailer rollover how does one determine the actual real base? Is it the outer edge of the tires or something less?

At the very outset we knew that we needed engineers who were familiar with the dynamics of tractor trailer rollovers. We were convinced that the estimates offered by the prosecution witnesses were greatly exaggerated, because of enthusiasm on the part of the police investigator and inexperienced with tractor trailer dynamics, on the part of the prosecution's accident reconstruction engineer. But we were also convinced that a mere competing static model of rollover speed would neither be sufficiently persuasive nor able to account for the changing variables over time which we felt contributed to this accident.

Our efforts to locate a suitable expert, using Dialog® to search for relevant literature, and references

from other engineers, led us inevitably to the Transportation Safety Research Institute in Ann Arbor, Michigan, an industry and government funded research center. From there we were led to Jim Bernard and Marty Vanderploeg, former researchers at that Institute and professors of mechanical engineering at Iowa State University, in Ames, Iowa.

Bernard and Vanderploeg had years of research experience in the transportation safety area had developed a computer program which was capable of simulating vehicle dynamics, including the tractor-trailer rollover. Bernard and Vanderploeg have since formed a company called **Engineering Animation, Inc.** (ISU Research Park, 2625 N. Luke Drive, Ames, Iowa 50010. (515)296-9908) providing forensic engineering animation services.

A. Factual basis for the simulation

1. Need to account for all variables

In a case where computer simulation will be used, the scope and detail of information which must be collected in far greater than what might ordinarily be necessary. Every factor which can be a variable in the program has to be accounted for. Some of the measurements, and some of the information which needs to be gathered, might be gathered in the course of a routine investigation, however this is not always the case.

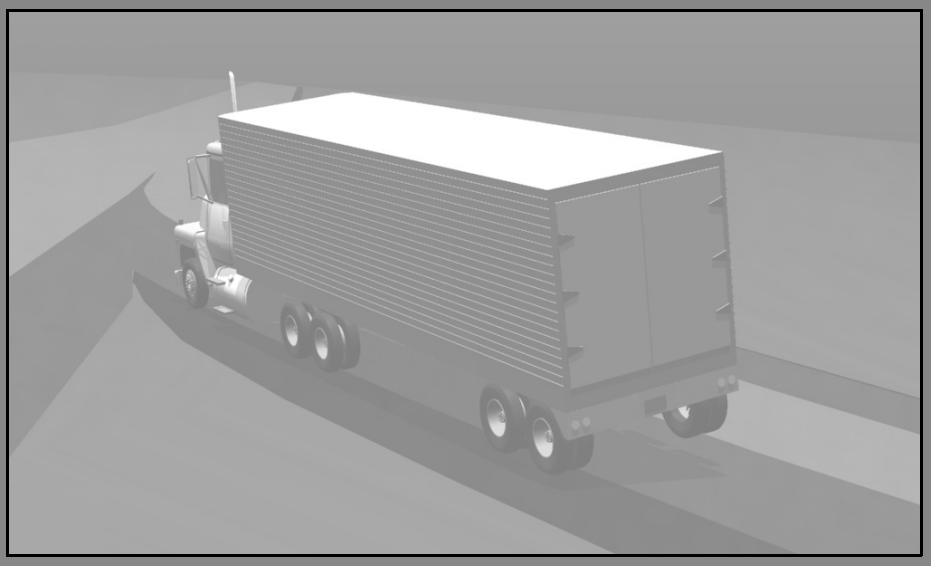
The first step for us in the Schepis case was to gather the information necessary to create the basic models which would be used by the program and in the animation process. This included detailed specifications of the make and model of the tractor and trailer, the engine, and the "fifth wheel." We obtained information about every spring and axle, the pounds of pressure in every tire, exact weights and dimensions of every part of the vehicle. Every measurement used was compared to manufacturer's specifications, for example, for spring deflection characteristics. Even the amount of gas remaining in the gas tanks, which never exploded, was considered.

As noted above, the contents of the load were described in detail so that the center of mass could be accurately calculated.

We went through the process of getting permission to make actual on-site measurements at the location of this accident. This required, temporarily, closing off the thruway exit and part of the thruway to allow careful measurements of the grade and super elevation of the pavement, and the turn radius, at ten foot intervals. All this information was provided to engineers who began preparing the computer simulation.

2. Investigation may require special skills or tools

In most cases calling for computer simulation, the actual investigation, or at least the collection of certain facts relevant to the computer simulation, must be done by experts. Engineers, surveyors, medically trained personnel, and so on may have to take a "hands on" approach to the vehicles, premises, highways, even bodies, which are involved in order to gather the detailed information necessary to create an accurate model.



3. Bi-products of preparing for a computer simulation

Because of the intense investigative effort called for if a computer simulation is to be utilized, the attorney gets thrown very early on into the case into a type of detailed inquiry into the facts and scientific issues involved in the case then might otherwise happen. This helps to "super charge" the defense and will result in the attorney considering at the earliest possible stage the

various scientific explanations for the events which have occurred. It will provide an occasion for the attorney not only to learn about the facts in more detail, but would also expose the attorney very quickly to the various scientific principals or theories which might be used to organize this factual information. Additionally, as the work progresses, the attorney will have a better chance to discover early in the case reasons to exclude alternate theories or an explanation for the events or to adopt alternate theories which had not previously been considered.

For example, in the Schepis case, having collected so much engineering information about this intersection, we also obtained records from the New York State Thruway Authority about the history of this interchange and discovered that, some years back, the freeway Schepis was entering had originally been a single lane at the point where it merged with the exit ramp from the Thruway and was later widened. We found that the freeway was widened without substantial modification to the entrance ramp, except for the last portion where the turn was tightened a bit in order to squeeze in a new lane. This effectively shortened the radius of the turn just at the point where it merged in with the freeway.[3]

Our engineering studies also showed that the superelevation of the highway undulated at this point, inconsistent with proper highway design and the original engineering specifications. These observations, which provided on obvious additional argument that the redesign of the highway contributed to the accident, would probably never have been discovered had we not gone through the effort to gather the information needed for a computer simulation.

4. "What if . . ." scenarios

Since computer simulations are "rule based" and will be effected by changes in the many variables which are programmed in, a computer operating a program is capable of running answers to "what if . . .?" scenarios that are presented, even in the middle of a trial. It might take some time for the mathematical output to be generated and the time it would take to come up with new renderings (animations) of that output might prevent that from being feasible, at least at the current stage of the development of these programs and their imaging capabilities. However, at least the possibility exists to change the data and get new results if developments at trial or later in the investigation warrant it.

B. Evidentiary Issues

The admission of computer animations in the courtroom involve some issues which are similar to those with computer animations, and more.

In one sense the video tape that is produced as a result of a computer simulation could also be described as a "summary" of the testimony of the expert witness. The video could be seen as a graphic rendering of the results of computations which the expert could described, but putting it in a more digestible format. In each case experts should expect to be challenged with respect to the accuracy of the original measurements used. Although the expert using a CAD program may expect to be questioned concerning the accuracy of that program in executing instructions, (that a 45º angle is in fact a 45º angle) the largest difference between the two types of evidence is that the computer program underlying a computer simulation is suppose to replicate reality according to the physical laws of the universe.

This means that it would be questioned whether or not the computer, when it predicts how objects will behave when subjected to other forces, can be squared with reality. This is a far greater challenge than is presented to the personal computer running a computer assisted drafting program. These programs are, as far as I know, only on main frame computers that can only be developed over a long period of time using a great amount of experimental data. On our truck rollover case we were fortunate to find engineers who not only had wealth of experience in tractor-trailer rollover research but who also had the computer program constructed to replicate such occurrences. Thus, the same person who had the underlying skill and knowledge to testify about this accident also was a person who had assisted in writing this huge simulation program, executed on the program, and oversaw the rendering process which resulted in a video tape which lasted less than a minute.

In other situations, the primary "expert" with knowledge about the particular area of science and technology, but may have no knowledge about computer simulations, would have to work with the engineers capable of writing a simulation program and then graphically portraying the output. Therefore, not only must the computer program be validated as accurately executing the applicable "laws of the universe" under the

circumstances, those laws themselves must be validated by an expert, including any additional premises or assumptions which may be found to apply. In our case we were prepared not only to discuss all of the physical principals which come into play when a tractor-trailer rolls over, we were also prepared to show how the computer program was developed and how it had been tested to demonstrate that it is accurate in predicting and describing such events. We had a "real life" video tape of a tractor-trailer rollover which could be compared with that depicted in the computer simulation so that jurors, and the judge, would have the opportunity to observe how closely the real life rollover followed that depicted in the simulation in our case.

1. Notice requirement

There is little doubt that under the New York State Discovery Statute the preparation of the computer simulation would be a scientific examination or experiment or test of notice of which should be given to the opponent. Not only is this a statutory requirement, but it is nothing less than an invitation to the court to exclude such evidence, for any reason, where it appears that the opponent has been caught by surprise.

C. Economic Issue

Obviously, computer simulations are going to be more expensive than simple animations. Animations can be done by non-experts, relying on factual input provided by the attorney or measurements at the scene, and so on. The computer simulation, on the other hand, may involve experts at three different levels: the fact gathering process, such as field measurements by engineers or surveyors; experts in the basic scientific field which is implicated by the event being reconstructed or simulated, and a separate group of experts capable of translating the scientific principals involved in evaluating the incident into a computer program which can come essentially, replicate these occurrences in accordance with the applicable laws of nature.

In simple cases, with usual objects, such as automobiles and fewer variables, such simulations could be perhaps performed for in the $10,000 range. In the truck rollover case we spent approximately $25,000. For only slightly more we could have made a much more elaborate presentation with all of the information that had been gathered. However, time constraints restricted us from graphically rendering all of the simulations which we had conducted. From the view point of the client, however, the money was well spent because it appeared that the jury was heavily influenced by the computer simulation.

D. Results of the simulation

The original objective in the Schepis case was to determine the lowest speed at which a similarly configured tractor-trailer might rollover, without taking into account the possibility of a shifting of the load, equipment failure, or poor roadway design.

These simulations indeed showed that this truck would have rolled over at a much lower speed than that calculated by the prosecution's expert, about 35 mph. Yet this was not at such a low speed that we would safely assume that the jury would find that the driver was operating the tractor-trailer at a "prudent speed".

However, the simulation also revealed to us this very important fact: having rolled the truck over in a simulation at the lowest possible speed, approximately 35 mph, we discovered that its first point of contact with the ground was 40 feet short of the original point of contact in the actual accident! This tended to prove that *something other than the speed of the truck* was responsible for the truck rolling over. The simulation proved that the truck never could have gotten 40 feet further around the turn if it indeed was going 33 mph.

So, although the initial simulation did not offer persuasive evidence that a similarly configured vehicle would, other things being equal, be capable of rolling over at a speed very close to the posted "warning" speed limit of 25 mph, **it conclusively established that speed alone was not the cause of the rollover.**

This invited us to perform an additional simulation where we attempted to replicate the effects of a static load shift inside the trailer at the time it entered the turn. This reduced the rollover speed to approximately 28 mph, well within the range what might be considered a prudent speed. Even then the mathematical output from the simulation showed that the tractor-trailer still rolled over about 25 feet short of the actual point of first contact in the accident. This left open the further arguments that the load may have shifted *at the moment of the turn* adding an additional dynamic force, and that a certain equipment failure, a broken leaf spring hanger, as well as the poor highway reconstruction had contributed to the truck rolling over, even at the

recommended speed.

Thus, the simulation taught us that it not only had the power to answer the question we originally asked, but to raise for us, and even imply answers, questions that we had not thought about before embarking on the simulation.

E. Jury Issues

1. Is it too slick?

Initially we had a concern that jurors might tend to disregard the computer simulation, thinking that it was too "slick" to be real and that we had simply spent big bucks to come up with a "cartoon" that supported what we were saying. Balanced against that concern was the awareness that jurors are very accustomed to computer imaging and graphics and to information presented over a "television - like" medium. Post-trial interviews with jurors confirmed two major things: the jurors appreciated the video and the effort that went into its presentation and believed that it was accurate. Jurors especially appreciated the contrast between our effort at clarifying the scientific issues by use of the computer simulation compared to the perfunctory and conclusory approach of the prosecution "expert" who has demonstrated to have very little real knowledge about tractor-trailer configurations and dynamics and who was totally unfamiliar with the voluminous literature on tractor-trailer rollovers.

Second, the computer simulation had the effect of "validating" the testimony of our expert witness. In the eyes of jurors a witness who is not only experienced in the area, in this case tractor-trailer rollovers, but also who has demonstrated the capability to help create and to operate a computer simulation, exhibiting familiarity with every stage of the process was somebody especially worth crediting.

In the final analysis jurors not only appreciate the use of computer simulations or animations in cases involving any type of complex data, I believe that they actually have come to expect it.

Oh yes, Antonino Schepis was acquitted of all charges, including the traffic violations.

Footnotes:

1. © 1994 Mark J. Mahoney

2. See, Mahoney, The Right to Present a Defense (1991) available from the author, or the New York State Association of Criminal Defense Lawyers. Since, in a manner of speaking, the "standard of proof" which the accused must meet to prevail is to create a reasonable doubt, it is not logical to raise the threshold of admissibility higher than the requirement that the evidence be of sufficient quality that it might cause a reasonable juror to have a doubt.

Constitutionally, the 6th Amendment right of compulsory process, or the Right to Present a Defense, has been clearly applied to require the admission of evidence offered by the accused which would not be admissible if offered by the prosecution. The defense may not be limited, with respect to the admission of evidence, to parity with the prosecution.

3. This was illustrated with overlays upon the original Thruway design upon a current aerial photograph reduced to the same scale which showed how the modification made the interchange less forgiving to vehicles entering the freeway.