LIFE IN THE POINT CLOUD: THE USE OF 3D SCANS AND DEFENDING LIABILTY CLAIMS

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Introduction

The use of data obtained by 3D scans processed into point cloud images of a local environment can be invaluable aids in the defense of a wide variety of litigated claims. From premises liability and motor vehicle accidents through construction defect cases, 3D point cloud imaging can provide litigators with a powerful tool for demonstrating to the jury the party's views and theme of a case. The significance, protocols and analytical value of collecting and preserving physical evidence at an accident scene is widely understood among forensic experts and litigation counsel. The additional value that can be provided by the collection of evidence preserved digitally by means of reality capture can be equally or even more important. Reality capture tools such as 3D laser scanners and drones allow experts to digitally preserve evidence so that the physical evidence can be released, and the data produced can be utilized in a multitude of ways over the course of investigation an analysis, but only if the data is collected and processed properly by an expert who can identify the right tool for the job and get the most out of what can often be billions of data points.

Data Collection and Processing Methodology

The collection of 3D reality capture data begins with the selection of the appropriate tool for the subject and circumstances. Terrestrial laser scanners are commonly used in structured environments such as building interiors, construction sites, or accident scenes with fixed geometry and can be used to document entire scenes or specific pieces of evidence. These scanners operate by emitting laser pulses that reflect off surfaces, measuring distances at high frequency to generate dense point clouds. The result is a highly detailed digital record of the physical environment, accurate down to the millimeter, which can be critical when documenting factors such as visibility, distances, slopes, and potential or alleged hazards.

Drones, or unmanned aerial vehicles (UAVs), are particularly useful for capturing large or otherwise inaccessible sites such as rooftops, wide intersections, or remote terrain. Equipped

with high-resolution cameras or LiDAR payloads, drones can perform systematic flight paths that collect overlapping imagery or laser data. When processed using photogrammetry software, the imagery can be used to create 3D models and orthomosaic maps, while LiDAR-equipped drones can generate high-fidelity point clouds even in areas with complex vegetation or limited lighting. The choice between photogrammetry and LiDAR depends on the required accuracy, environmental conditions, and the nature of the surface materials being captured.

Whether documented with terrestrial scanners, drones, or one of the many other reality capture options, once the raw data is collected, it must be registered and processed. For terrestrial scans, this involves aligning and stitching together multiple scans into a unified coordinate system. In drone workflows, photogrammetry software uses algorithms to identify common features across images and triangulate the position of points in 3D space. The result is a point cloud or textured mesh that reflects the real-world dimensions and geometry of the captured site. Proper registration is critical—not only to ensure visual coherence but also to allow accurate measurements and spatial analysis.

Post-processing of the data includes filtering noise, classifying points, and potentially decimating overly dense areas for easier handling of large datasets. Experts may also incorporate control points to georeference or constrain the dataset, resulting in greater accuracy. Deliverables can then be customized for litigation needs, ranging from animated fly-throughs and interactive 3D models to 2D plans or cross-sections showing key details from the scene. These outputs serve not only as illustrative aids in mediation or trial but also as tools for expert analysis.

Critically, the reliability of 3D reality capture data hinges on the competence of the technician or expert conducting the work. A poorly planned scan, insufficient overlap, or failure to consider environmental factors such as reflective surfaces or moving objects can degrade the quality and admissibility of the data. Therefore, the individual overseeing the capture must not only understand the technology but also have a strong grasp of the case context, forensic best practices, and the downstream uses of the data. In the hands of a qualified professional, 3D reality capture becomes not just a means of documentation, but a cornerstone of compelling and credible litigation strategy.

Admissibility Concerns

In terms of being admissible demonstrative evidence to support an expert's opinions, 3D scanning point cloud data faces much the same test as other demonstrative evidence such as photographs. In other words, if a competent witness can testify that correct procedures were followed in performing the 3D scan to an extent that they accurately represent the conditions they purport to show, they ought to be admissible generally in much the same way a photograph is.

Beyond that, the extent to which 3D scan data is being used to create more complex animations or simulations, the evidence may well be subject to challenges under Federal Rule 702 or the local equivalent and *Daubert v. Merrill Dow Pharmaceuticals, Inc.* 509US579(93). Under that standard, the question will be whether the scanned evidence is being used to illustrate the expert's opinion or as a basis for that opinion, with a lower threshold for demonstrative evidence. On the other hand, if the expert indicates that an issue relied on measurements obtained from the 3D scan data, a greater showing will be needed that this is the kind of reliable data relied on by experts in that field in formulating their opinions. At this point in its development, this technology is widespread enough that there is a significant chance that, if properly prepared, the expert will be in a position to lay a foundation that this is material easily relied on by experts in that field.

Claim Investigation/Insurance Cost Considerations

It is very important for Insurance carriers to understand the advanced technology which is available to help facilitate the defense of their claims especially complex litigated claims and complex claims with multiple parties like construction defect losses. While not every claim is ripe for use of technology as part of the defense, spending money to investigate the right ones can allow the claims professional and defense counsel to properly defend the matter, push to an earlier resolution and possibly avoid protracted litigation. The use of technology can provide defenses as well show the weakness and Insured liability. 3D scans actually bring the facts of the loss to "life" for the parties to see how the loss could or could not have occurred. This can be instrumental for the plaintiff, co-defendants and juries (if the matter is headed to trial) as many times, it can be confusing to understand and visualize the expert's explanations in relation to the loss' cause and origin especially on highly technical losses.

Case Study Examples

As has been indicated, this technology can be utilized in a wide variety of litigated cases. Some examples follow:

Motor Vehicle Accidents

In a recent case that was tried to a defense verdict, 3D imaging played a critical role in achieving that positive result. This was a death case in which the Plaintiff's sedan crossed into the lane of a commercial truck towing a storage building on a trailer. The sedan went under the trailer, killing the driver almost instantly in a catastrophic wreck. The case involved significant sympathy factors for the decedent, who was a mother of three, and the on scene images of the decedent's car and body were extremely graphic and would have been devastating if viewed by a jury in the damages phase of the case.

In this case, however, immediately following the accident, a forensic engineer was engaged to document the vehicles and the scene through photographic and 3D imaging technology. The Plaintiff's theory of liability was that the defendant's truck had been in the decedent's lane of travel prior to the accident, and that she came across into the truck's lane to avoid contact with a truck in her lane. The plaintiff's expert created a simulation of the events based on our expert's 3D data showing how this theoretical set of circumstances could have occurred. Because we had all of the 3D data from the expert's early investigation, however, we were able to show the jury convincingly that the truck had never left its lane of travel and that this was simply a left-of-center accident in

which Plaintiff crossed over into the truck's lane, causing the accident. The jury found this to be entirely convincing and came back with a defense verdict fairly quickly.

An interesting aspect of this case was that, in addition to using the data to support the defense theory, counsel was able to exclude an animation produced by Plaintiff's expert that would have been highly damaging. The Plaintiff used the 3D data, to an extent, to put together a computer animation showing a realistic looking view of the vehicles from above and from each vehicle's point of view, carefully and specifically outlining in a visually arresting format, the Plaintiff's theory of how the accident occurred. Because defense counsel had the data early on, a successful *Daubert* challenge to Plaintiff's animation, which was built without scientific backing for several key data points, including the speed of the decedent's vehicle prior to the accident, was mounted, excluding Plaintiff's animation just as his testimony would have reached its crescendo. This was significantly detrimental to the expert's credibility, and a key factor in the successful outcome.

Premises Liability

In a trip and fall case at a casino, the Plaintiff alleged that she had tripped on a small protuberance in the tile floor. This was a tile connector that extended marginally above the tile surface, and was alleged to have been the cause of another patron's fall about a month before. Faced with the concern of a potentially hazardous condition that had allegedly caused a previous fall, defense counsel engaged a forensic engineer to perform a 3D scan of the entire area, as well as photographic evidence and physical measurements. Given the casino environment, there was extensive surveillance footage, and the defense had available surveillance footage of the actual fall that Plaintiff suffered. When the expert was able to overlay the 3D cloud environment with the surveillance footage and line up points of reference so that the surveillance footage could essentially be seen in the 3D point cloud environment, he was able to locate the precise point at which that small protuberance existed on the floor. Viewing the video with the protuberance marked with a red line, it became very clear that Plaintiff did not, in fact, trip on this protuberance at all and had traversed several steps beyond the protuberance before her fall. Given that, the concern of an alleged prior fall on this obstacle, and indeed the obstacle itself, became irrelevant to the cause of her fall. This supported the original theory, based on a view of the surveillance footage and statements she made to the paramedic following her accident, that she had tripped on her own foot.

Fire Investigations

In a case involving a fatal fire in the sleeper cab of a tractor trailer, defense counsel was able to utilize 3D scan data to simulate the smoke conditions during the fire. In that case, it was alleged that a fire had originated at the point of an e-cigarette located on the driver's seat of the truck. Plaintiff was asleep in a bunk near the ceiling of the sleeper cab toward the rear of the cab. He was overcome by smoke and unable to exit the cab and eventually passed away as a result. On inspection shortly after the fire, the forensic engineer had the opportunity to perform a 3D scan of the interior of the sleeper cabin and create a 3D point cloud environment of the cabin interior. The allegation of concern was the placement of a smoke detector in the cabin. Forensic testing indicated that the smoke detector had functioned properly, so the area in which it was placed, on a wall several feet down from the ceiling, was a significant potential issue. In analyzing the liability factors here, defense counsel was able to utilize the expert's 3D scanned cabin interior along with a variety of simulations of the pattern and velocity at which the smoke would have traveled to the

Plaintiff's bunk and back down to the smoke detector to obtain a fairly precise time interval that Plaintiff would have had to awake and escape the cabin once the smoke detector went off.

Construction Defect Claims

3D scanning can be an invaluable tool in analyzing and presenting the defense of construction defect claims as well. One particular example was a case in which the allegation against the supplier of certain laminated veneer lumber (LVL) beams was that the beams were inadequately sized and calculated to support the loads that they needed to support. In that case, a complete scan of the residence involved allowed the expert to match the plans and as built photographs with an overlay of 3D point cloud images to produce 3D renderings of home in plan detail with the beams highlighted in a separate color. This provided an invaluable graphic representation of the placement of the beams, which allowed the defense to support its conclusions that, where the beams were placed, they did not support anything approaching the load that Plaintiffs claimed they did. In addition, the graphic representation demonstrated that the beams had been installed precisely as designed and that, so installed, they are more than adequate to support the loads they bore. As opposed to pointing to plans and photographs separately and asking the fact finder to come to conclusions as to how those different media interacted with each other, defense's 3D cloud representations provided a clear and graphic image, all consolidated together, which made the point abundantly clear and allowed for a resolution at minimal cost to the Client.

Conclusion

The use of 3D point cloud technology in litigation can be invaluable in a wide variety of cases. Providing the type of clear and scientifically supported visual representations that this technology allows to the fact finder presents a tremendous opportunity for persuasion. The initial cost of obtaining the 3D scanned images is typically relatively low compared to the benefit that can potentially be provided down the road. Even in a case that appears to have clear liability defenses, unusual theories can spring up later that can be effectively countered by the early use of 3D scanning to preserve the digital environment.