

STATE OF MINNESOTA
COUNTY OF HENNEPIN

DISTRICT COURT
FOURTH JUDICIAL DISTRICT

State of Minnesota,

Case Type: Criminal
Court File No. 27-CR-18-6859
Hon. Kathryn L. Quaintance

Plaintiff,

v.

Mohamed Mohamed Noor,

**ORDER ON ADMISSIBILITY
OF LEICA VIDEO**

Defendant.

The above-entitled matter came on for a pretrial hearing before the undersigned Judge of District Court on April 2, 2019, in courtroom 1953 of the Hennepin County Government Center, 300 South Sixth Street, Minneapolis, Minnesota.

Amy Sweasy, Esq., and Patrick Lofton, Esq., appeared on behalf of the State of Minnesota.

Thomas Plunkett, Esq., and Peter Wold, Esq., appeared with and on behalf of Defendant Mohamed Noor ("Noor").

On February 15, 2019, the parties filed and served the motions *in limine*. One of Noor's motions challenged the admissibility of the State's Leica fly-through video. As the Court requested at the first pretrial hearing, the State filed its offer of proof with respect to its Leica fly-through video on March 15, 2019. At the second pretrial hearing held on March 29, 2019, the Court concluded that it lacked sufficient foundation to make a determination as to the admissibility of the Leica fly-through video. The Court granted the State an opportunity to present additional foundation evidence at a hearing on April 2, 2019.

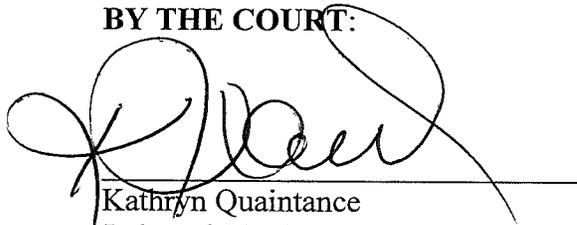
Based upon the files, records and proceedings herein, including the arguments of counsel, the Court makes the following:

ORDER

1. Noor's motion to exclude the State's Leica fly-through videos is **GRANTED**.
2. The Court permits the State to use the Leica scanner data to establish measurements, distance, and spatial relationships between objects.
3. The Court does not permit the State to use the videos or stills from those videos created with software from the Leica scanner data. The State may use the data and measurements themselves to label maps or other images of the scene.
4. The attached memorandum of law is incorporated herein.

Dated:

4/5/19

BY THE COURT:
Kathryn Quaintance
Judge of District Court

MEMORANDUM OF LAW

Although the parties styled the April 2, 2019, hearing as a *Frye-Mack* hearing, Noor's concerns cited in his motion and the Court's concerns in reviewing the initial offer of proof have more to do with the underlying factual foundation of some portions of the videos and the helpfulness of the videos to the trier of fact.

Because Leica-scanner mapping of crime scenes has not been upheld by a Minnesota appellate court, *see State v. Roman Nose*, 649 N.W.2d 815, 821 (Minn. 2002), however, and because the parties raised the issue at the hearing, the Court will apply the *Frye-Mack* analysis as a threshold issue for determining whether the measurements and maps created by the Leica scanner and its software are accurate and admissible.

The *Frye-Mack* standard asks first whether experts in the field widely share the view that the results of scientific testing are scientifically reliable, and second whether the laboratory conducting the tests in the individual case complied with appropriate standards and controls. *Id.* at 819.

At the April 2 hearing, the Court heard the testimony of William Henningsen, a forensic investigator of thirteen years with the Omaha Police Department and a forensic mapping specialist conducting laser-surveying sales, training, and consultation. Henningsen is a member of the IAFSM, an organization that establishes best practices in the use of equipment to get forensically sound data.

Henningsen testified that the Leica P30 scanner used in this case is accepted in the surveying and architectural communities for taking measurements and creating maps and models.

Henningsen and others testified that the Leica scanner provides line-of-sight mapping and does not scan through objects; thus, it must be moved to various locations within a scene to capture a full map.

Henningsen testified that the standard margin of error for survey-grade accuracy is .03 feet.

The Court heard testimony from Steven Swenson, manager of the forensic science laboratory for evidence processing at the BCA. He was the crime scene processing manager at the BCA when the Leica scanner was purchased, and he selected the Leica scanner.

Swenson testified that the BCA's Leica unit was validated prior to its use at any crime scene through the BCA's internal research project conducted at the U.S. Bank Stadium: The scanner scanned a NIST pole with twin targets at each end certified by the National Institute for Standards and Technology to be one meter apart. The scanner scanned the NIST pole accurately at 60 meters and at 120 meters from the scanner, 120 meters being the distance limit recommended for the scanner's accuracy.

Swenson testified that the BCA's Leica unit was validated once through this process and is checked weekly to make sure it is still providing accurate measurements.

The Court also heard testimony from Joe Cooksley, a forensic scientist at the BCA who was the crime scene leader for the processing of the scene in this case.

Cooksley testified that he was trained in the use of the Leica scanner by members of the BCA who had been trained by Leica. He passed a written and practical competency exam in its use for accurate results.

Cooksley testified that crime scene team member Alison Dolenc had used the Leica scanner under his supervision at the scene in this case and that he and Dolenc had worked together to select the locations for scanner use.

Cooksley testified that the seven scans of the scene in this case had been taken over the course of about seven hours, that he had not time-logged when each scan had been taken, and that objects within some of the scans had been moved. For example, in some scans the body of the decedent was present, in some it was covered by a sheet, and in some it was not present.

Cooksley testified that the scans of the interior of the squad car were taken days after the rest of the scene and after the car had been returned to service. The seats, objects, computer, and other movable objects within the squad car had been moved before it was scanned with no one seated in it.

At the April 2 hearing, the Court heard the testimony of Jake Hodapp, a special agent with the BCA who is trained in crime scene processing and has provided crime-scene photography, videography, and 2-D diagrams. He now works with Leica software to create 3-D representations of crime scenes. Hodapp testified that he took a week-long training from Leica to learn how to use the scanner and its associated software, Cyclone.

Hodapp testified that the data collected by the Leica scanner from the various scans in this case was imported into Cyclone and “stitched together” by the software to create one point data cloud mapping the scene. The accuracy of the point data cloud was validated by measuring the meter-long NIST rod that had been scanned at the scene and checking the alignment of geometrical objects. Hodapp testified that there were no accuracy or alignment issues with the data cloud in this case. Henningsen testified that he calculated the margin of error in the data

collected in this case by comparing the alignment between the scans, and that at its largest, the margin of error was 0.014 ft., or less than half of the surveying standard.

Hodapp testified that the underlying data of measurements of objects and their spatial relationships do not change, but that they can be represented from various points of view in 2-D stills or in 3-D video.

This Court finds that the Leica scanner used in this case was accepted in the surveying community for taking measurements and creating maps. It was validated and calibrated prior to its use in taking the measurements at the crime scene in this case. The data points were tested against an artifact and across scans for internal reliability, with an error rate of .014, within the acceptable standard for surveys.

In so finding, the Court notes that sophisticated users of machines and software are competent to testify as to whether the machine or software is functioning properly. *See, e.g., State v. Ards*, 816 N.W.2d 679, 687 (Minn. Ct. App. 2012).

The Court finds that the measurements, the underlying data of the points mapped in the point cloud and the calculations made between them by means of software, are as accurate or more so as crime scene measurements taken by other method.

It is the animation and demonstration of that data, in addition to other information, in the videos that concerns the Court. In his motion, Noor argues that the fly-through video is inaccurate, confusing, and prejudicial because it does not represent what a person would actually see and speculates as to possible bullet trajectories. The Court agrees that the fly-through videos are inaccurate, confusing, and prejudicial and disallows their use at trial.

Computer-generated illustrations of evidence in the form of static or enhanced images are subject to the requirements of any evidence, i.e., they must accurately depict the evidence and be

helpful to the trier of fact. *See* Minn. R. Evid. 401, 403, 901; Kenneth S. Broun, ed., 2 McCormick on Evidence § 214 (7th ed. 2016);

It is the Court's understanding that the fly-through video does not purport to show what Noor saw and may not be used in support of any testimony to that effect.

As to whether the fly-through videos are helpful to the trier of fact, testimony at the hearing established that the data from the Leica scanner is helpful in creating maps showing the spatial relationships between objects at a crime scene, though it cannot be said at precisely what time. The State has argued and elicited testimony that the 3-D image provided by the video provides a better sense of spatial relationships than 2-D images.

However, the Court finds the fly-through depictions confusing. The movement is disorienting, and it may lead to speculation as to what may or may not be represented by the movement and whether it bears relevance to the facts in the case. The depiction of objects such as the squad as transparent is also disorienting. Even more importantly, the disappearance and reappearance of objects that may have been moved between scans is distracting and may lead to speculation or inaccurate conclusions as to the relationships of those objects. Even after four hours of testimony, the Court was still perplexed by exactly what was being represented.

Stills have the effect of focusing attention on relevant information and are less confusing for that purpose.

The Court permits the State to use the Leica scanner data, but not the videos or still shots from the videos, to create and label maps of the scene and to establish measurements, distance, and spatial relationships between objects on other images of the scene.

The portions of both offered fly-through videos that purport to illustrate field of fire have less foundational reliability, are less helpful, and are more potentially prejudicial, and the Court excludes their use entirely.

These portions of the videos are hypotheticals, not just demonstrations. They formulate a computer-generated conclusion about the events at issue. *See* Broun, § 218. The federal analog to Minnesota Rule of Evidence 901 requires that the foundation be laid for this kind of evidence as the accurate result of a system or process. In this analysis, the Court examines the sufficiency of the factual basis that serves as input and its substantial similarity to the real event and the sources of the factual basis for the simulation, as well as other factors that relate to the Court's analysis above under Rule 702. *Id.*

In one video, a disproportionate “pawn” is inserted in the passenger seat of the squad car where Noor is alleged to have been seated. A second pawn is positioned outside the squad car at the foot position of the decedent at a time her body was scanned and at the height of her bullet wound from the ground. There is no other evidence in the case to support the positioning of these pawns. To the extent that they appear to represent where Noor and the decedent were located at the time of the shot, they are misleading because those exact locations are not known.

There was testimony that the data sets and calculations underlying these portions of the videos were created to answer the question of whether a bullet could have passed through the driver-side window of the squad car and hit the decedent.

It is not clear whether there is still a question of fact as to whether the shot was fired from inside the vehicle.

There was testimony that information used in the simulations and calculations was partially based upon testimony from Officer Harrity in another proceeding, though it was not

discussed what testimony and what it was used for. There was testimony that the simulations do not take into account a significant and unknown variable, which was the location of Officer Harrity in the driver-side seat of the squad car.

The illustration of several admittedly speculative ranges of fire does not help the trier of fact in determining facts at issue in this case. It does not help the jury determine where the decedent was located at the time she was shot. It does not help the jury determine where Noor was. It does not help the jury determine where Officer Harrity was. It offers possibilities without taking into account that crucial information is missing that could eliminate those possibilities.

The Court finds that the underlying data may be used to create 2-D site maps and images. The Court agrees with Noor that the first name of Justine should be changed to her last name in any labeling. *See State v. Blom*, 682 N.W.2d 578, 610 (Minn. 2004).

K.L.Q.