



### D20 Criteria for Identification of Gunshot Events From Video Imagery: A Case Study

*Philip N. Williams, BS\*, Federal Bureau of Investigation, Federal Bureau of Investigation Laboratory, Counterterrorism and Forensic Science Research Unit, Building 12, Quantico, VA 22135*

After attending this presentation, attendees will gain an understanding of the challenges, possible solutions, and minimum useful criteria for identification of possible gunshot events using crime scene surveillance video.

This presentation will impact the forensic community and/or humanity by establishing a common framework against which the criminal court system can evaluate the validity and admissibility of expert witness testimony concerning gunshot event determinations from video evidence alone.

With the prevalence of video surveillance systems in the United States, the chances of capturing criminal and police shooting incidents on video has increased significantly. One of the pertinent questions frequently raised during the investigation of these incidents is the actual number of shots fired. In many cases the usefulness of the video images in determining this critical issue is either overlooked or presumed to be of little value. One of the principal reasons for this relates to the difficulty of positively identifying probable gunshot events using the video images in isolation from other evidence, and the lack of validated criteria for establishing the occurrence of such events from video alone.

An approach to gunshot determinations from video will be presented that will set forth a series of criteria for determining which events evident in the imagery could or should be used in these determinations. In addition to simple observation of isolated events, courts will also demand for admissibility purposes, some form of objective cumulative threshold criteria before a reasonable conclusion that a gunshot event has occurred can be reached. It is these criteria and methods for quantification of the results of the analysis that are critical in admissibility related hearings.

An actual forensic case study for this analysis, that was adjudicated in California will be presented.<sup>1</sup> In this case, analysis showed that a series of isolated events could be demonstrated to actually be connected within the context of proper temporal and spatial analysis, which lead to more or less decisive conclusions for each event as to their nature as gunshot events. In some cases, a series of isolated events, while still connected temporally, may be insufficient to reach a decisive conclusion, based on the nature and/or number of events and those issues will also be addressed. This analysis was used by prosecutors in support of firearms reports, and crime scene analysis, which combined, largely refuted the Defense contention that the accused had fired warning shots prior to shooting his intended victims.

The analysis will also show that it is possible to identify events shown in the imagery as falling into one of three categories. Category one, is events which meet the full range of criteria as to number, type, space and timing, and therefore may be reasonably classified as gunshot events. Category two, is events which meet certain criteria, such as a number of isolated events, temporal connection, or type, but are of insufficient number, type, or timing such that it is not possible to exclude event types other than gunshots. Category three events are isolated events that meet only one of the threshold number, type, or timing, criteria to be reasonable considered as having been the result of a gunshot, but are still consistent with an action sufficiently anomalous to draw attention for additional analysis.

It is anticipated that through the publication of this analysis a proper foundation may established sufficient to support broader acceptance by the Courts for video based gunshot evidence, and reduce evidentiary challenges for this type of evidence in the future.

#### **Reference:**

<sup>1</sup> The People of the State of California, Plaintiff, -Versus- Stuart Alexander, Defendant, Docket NO. 139527.

#### **Gunshot, Video, Forensic Video Analysis**