B92 Implementing 3D Technology Into a 2D Philosophy

Heather J. Seubert, MS, FBI Laboratory, Firearms/Toolmarks Unit, 2501 Investigation Parkway, Quantico, VA 22135*

After attending this presentation, attendees will better understand some of the implementation hurdles that can be easily overcome for introducing new technologies and developing a strategy as to how to prepare for implementation.

This presentation will impact the forensic science community by providing an overview of integrating new technology into a science that hasn't seen much change in its methodology. This presentation will also inform the forensic science community about emerging technologies within comparative-based disciplines that are being evaluated for future casework applications.

The firearms/tool marks discipline can be traced back to the early days of the 1920s when early pioneers such as J.H Mathews, Calvin Goddard, and James Hatcher were exploring "forensic ballistics." In those early days of researching, many of their methods showed close parallels to the new technologies that are emerging relying upon measurements and illumination techniques. Also, the same question continues to motivate the practitioner to determine whether or not a bullet or cartridge case could be "identified" to a particular firearm. Even before the arrival of the comparison microscope, a match could be determined through the use of a filar micrometer, which was simply a special device placed at the top of a compound microscope and contained a scale and a cross hair, which moved along a scale. Another method used was the method of interchange. This method depended upon an illumination technique which involved a long camera set-up with a short lens.

Now, nearly 90 years later, these very principles of measuring and illumination that highlighted areas on bullets and cartridge cases then are being advanced to a level beyond the 2D world. These advancing technologies require the right approach for implementation and almost a strategy map for integration. The Firearms/Toolmarks Unit (FTU) of the FBI Laboratory has been evaluating and validating 3D technologies to enhance an identification conclusion with the desire to establish a qualitative and quantitative threshold which will introduce an objective component to this subjective discipline. Over the past two years, the FTU has acquired many of the advancing technologies available to the forensic science community in an effort to develop methodologies, build collaboration, and further the discipline of firearms and tool marks. The technologies the FTU has begun evaluating includes the Sensofar Confocal Microscope, the TopMatch Gelsight technology, the Alicona Focus Variation, and the EvoFinder. Over the course of this validation journey, the FTU has experienced challenges. This presentation will highlight some of those challenges (such as gaining acceptance from practicing examiners, fiscal forecasting for support from management, surviving technology hurdles) and will discuss how to prepare personnel to perform the evaluation and testing of these systems, setting up organized sample databases, preparing samples for testing, maintaining company support, estimating the fiscal projections for the continual maintenance and upgrades, building collaboration, and looking downstream to how the results generated will be articulated in a report of examination. And, finally, this presentation will examine how the community prepares for the legal challenges that will accompany the admission of these technologies in a court of law.

Validation, Legal Challenges, Technology

*Presenting Author