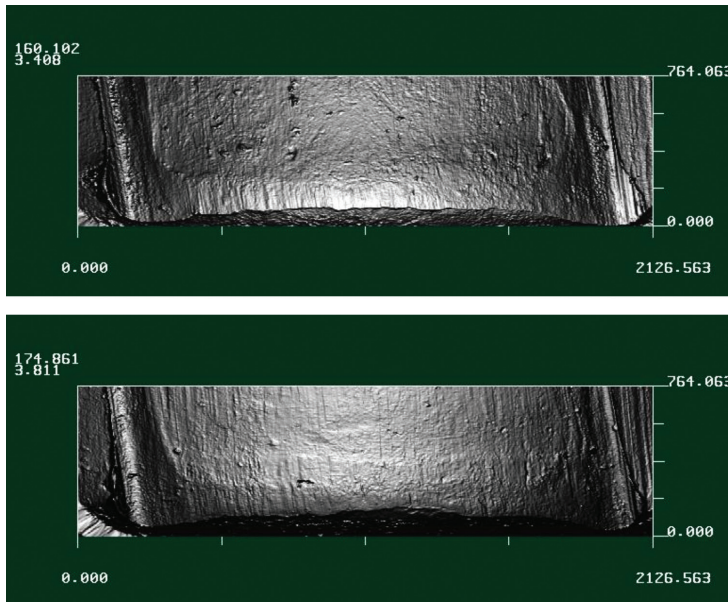


NIJ and Intelligent Automation, Inc.—Demonstrating Objectivity in Ballistic Identification

Statistical Validation Using Topographical Imagery

Moving Knowledge from Research to Impact



“The problem firearms examiners have had when testifying in court is that their conclusions are guided by experience and are difficult to quantify. With this and related studies, there is now a body of science that can help firearms examiners convince a jury of the accuracy of firearms identification for certain firearms barrels.”

Benjamin Bachrach, PhD
Intelligent Automation, Inc.

Synopsis of Problem and Solution

Firearms experts are seeking to strengthen their understanding of the accuracy and reliability of methods they use to associate fired ammunition recovered from a crime scene with a particular firearm. This is one of many studies to focus on expanding the scientific basis of firearms identification by developing quantifiable measures to help evaluate the evidence and explain the findings to a jury.

Through grants from the National Institute of Justice (NIJ), Intelligent Automation, Inc. (IAI) conducted a ballistics analysis study. During the study, over 2,800 bullets were fired, retrieved, and compared using a first-of-its-kind ballistic analysis system developed by IAI. The innovative system was topography-based (3D), as well as automated. The statistical analysis of the results from the comparisons performed by the automated system demonstrated that the premise of firearms identification could be validated in a quantitative manner. During its first NIJ study in 2005, IAI conducted an analysis using 2D data. The incorporation of 3D data (topographic imagery) was an innovative advancement superior to the existing photographic approach.

Benefits

- The statistical analysis of the results of the comparisons performed by the automated system demonstrates that firearms identification can be validated in a quantitative manner.
- A topography-based automated system allows for analysis and comparison.
- An IAI NIJ ballistics report has been used in several court cases.

The Future

- The next step in automated ballistic identification techniques will require a different approach for characterizing land engraved areas (LEAs).
- Innovations will be needed to correlate the signatures.

NIJ-Funded Research

Through grants from NIJ and the National Science Foundation (NSF), Benjamin Bachrach, PhD, Vice President of the Signals and Systems Division, IAI, has conducted ballistic analysis studies that led to the development of a unique 3D-based ballistic analysis system. During the project, Dr. Bachrach collaborated with a number of firearms examiners who contributed their expertise and time, including the Baltimore County Police Department and the Federal Bureau of Investigation. IAI's technology was further matured through commercialization.

Bringing Research to Practice

- IAI licensed its patented BulletTrax-3D bullet identification technology to Forensic Technologies, Inc.
- The technology has been integrated into Forensic Technology's IBIS TRAX-HD3D product in order to capture high-resolution images and topographic information from fired bullets at the nanometer level. Its 3D sensor technology provides optimal performance for the specific characteristics of bullet markings.
- The topographical information has helped police and military organizations around the world gain actionable information from firearms and their fired ammunition components.
- The IAI techniques developed during the research have also been used for other government projects, such as in nondestructive evaluation on turbine blades.



BulletTrack System provided by Forensic Technology, Inc.

More Information

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