

American Academy of Forensic Sciences American Society of Crime Laboratory Directors International Association for Identification International Association of Coroners and Medical Examiners National Association of Medical Examiners Society of Forensic Toxicologists/ American Board of Forensic Toxicology

May 14, 2025: NIST FORENSIC PROGRAMS TERMINATED

PROGRAM	USE	JUSTIFICATION FOR NEED
Firearms/ Toolmarks Lab	Research and Development for standards and databases for 3D firearms analysis.	Firearms and toolmark examinations are one of the most challenged forensic analyses in American courts. Emerging technology for three dimensional toolmark topography will allow more accurate statistical interpretation of evidence for courts. A key advantage of 3D imaging is that it allows high-definition scans of the actual surface topography of a sample with high repeatability, which is important for database searches during the investigative phase.
	Developing standards, reference samples, and procedures for measurement quality assurance and interoperability	The development and implementation of 3D firearms and toolmark analysis requires concurrent development of standards, reference materials and quality assurance procedures. Interoperability among manufacturers is imperative for universal access to databases.
	Building research and reference databases of toolmarks for method development and statistical evaluation of the strength of the evidence	Analysis of firearms and toolmarks is a subjective science. The creation of non-subjective statistical evaluations of evidence depends on reference databases and methods for comparison. Without these databases and method development, the 3D firearms and toolmark examination will not produce valid and reliable results. The valid and reliable use of reference databases
	Developing objective metrics and algorithms for evaluating the similarity of toolmarks	requires metrics and algorithms to decipher, interpret and report on the similarity of questioned toolmarks and the databases against which they are compared.
	Developing statistical models and procedures to quantify the strength of the evidence	Once the evaluation of the similarity of toolmarks is accomplished, procedures must be developed to quantify in objective terms the strength of the comparison.

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