

Рис. 7. Сравнение следов на пулях, имеющих коническую форму: *а* – пули, поступившие на исследование; *б* – результат сравнения следов в пределах выделенных поясов

чае резко увеличится число поясов, на которые необходимо разбивать развертки пуль, что приведёт к вырождению высоты самих поясов и принципиальному усложнению процесса идентификации;

3) при использовании автоматизированных идентификационных баллистических систем для получения цифровых изображений следов скани-

ровать необходимо каждый *N*-й пояс отдельно. При этом середина пояса записи должна совпадать с высотой, на которой пуля имеет диаметр D_N . При проведении проверок по электронной пулетеке рекомендуется использовать цифровые изображения поясов, полученные сканированием участков с минимальной радиальной деформацией пули.

Примечания

¹ Федоренко В. А., Семенова К. М. Влияние деформации выстреленных пуль на искажение идентификационной

информации в следах на них : материалы IV Всерос. науч.-практ. конф. по криминалистике и судебной экспертизе. М., 2009. С. 325–328.

² Там же.

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ФОРМИРОВАНИЕ СИСТЕМЫ ПОВТОРЯЕМОСТИ СЛЕДОВ УСТОЙЧИВОСТИ И КАЧЕСТВА ДЛЯ АМЕРИКАНСКОЙ БАЛЛИСТИЧЕСКОЙ ИДЕНТИФИКАЦИИ С ИСПОЛЬЗОВАНИЕМ НИСТ SRM СТАНДАРТА ПО ПУЛЯМ И ГИЛЬЗАМ



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В работе представлен положительный опыт реализации национального проекта по баллистическому идентификационному сравнению изображений, проведенному Национальным институтом по стандартам и технологиям США (НИСТ) совместно с Бюро по алкоголю, табаку, огнестрельному оружию и взрывным устройствам (АТФ). Этот проект направлен на обеспечение качества работы баллистических идентификационных лабораторий США.

Ключевые слова: криминалистика, следовая устойчивость, баллистическая идентификация, справочные материалы (SRM), стандарт по пулям, стандарт по гильзам, Национальная объединенная баллистическая информационная сеть (НОБИС).

Establishing a Traceability and Quality System for U.S. Ballistics Identification Using NIST SRM Standard Bullets and Cartridge Cases

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Positive results of introduction of project NBIC conducted by NIST in conjunction with ATF. The project is designed to ensure the quality of ballistic identification ballistic laboratories in the USA.

Key words: forensic science, traceability, ballistics identification, standard reference material (SRM), standard bullet, standard cartridge case, National Integrated Ballistics Information Network (NIBIN).



NIST in collaboration with ATF has developed the Standard Reference Material (SRM) 2460 Bullets and 2461 Cartridge Cases. In response to the guidelines issued by the American Society of Crime Laboratory Directors/Laboratory Accreditation Board (ASCLD/LAB-International) to establish traceability and quality assurance in U.S. crime laboratories, a NIST/ATF joint project entitled National Ballistics Imaging Comparison (NBIC) was initialized in 2008. The NBIC project aimed to establish a National Traceability and Quality System for ballistics identifications in crime laboratories within the National Integrated Ballistics Information Network (NIBIN) of the U.S. The SRM bullets and cartridges were used as reference standards. 19 ballistics examiners and experts from 13 U.S. crime laboratories participated in this project. 18 of them each performed 24 periodic image acquisitions and correlations of the SRM bullets and cartridges over the course of a year. The correlation scores were collected by NIST for statistical analyses, from which control charts and control limits were developed for

the proposed Traceability and Quality System and for promoting future assessments and accreditations for firearm evidence in U.S. forensic laboratories in accordance with the ISO 17025 Standard.

NIST SRM bullets and cartridge cases (fig. 1) function as reference standards for establishing metrological traceability for both the topography measurements at NIST and for the image correlations of NIBIN¹. For the topography measurements, the measurement traceability is established using the SRM bullets and cartridges and the NIST 2D and 3D topography measurement system with two NIST proposed parameters: the cross correlation function maximum CCF_{max} and the signature difference D_s , both are traceable to the SI unit of length. For the image acquisitions of NIBIN, traceability is supported by correlation of the images of SRM bullets and cartridges captured at local Integrated Ballistics Identification System (IBIS)* sites with respect to the Golden Image established by the reference IBIS of the National Laboratory Center of ATF.



Fig. 1. A NIST Standard Reference Material (SRM) 2460 Standard Bullet (left) and a SRM 2461 Standard Cartridge Case (right)

A flow diagram for the Traceability and Quality System using the SRM bullets is shown in fig. 2. It started with the six master bullets fired at ATF and FBI (Federal Bureau of Investigation) which were profiled at NIST as shown by branch 1. The resulting set of six digitized profile signatures was used as the virtual standard that determined the tool path of a numerically controlled diamond turning machine at NIST to produce the physical standard of the SRM bullets². One of them, numbered SRM 2460-001, was kept at NIST as a check standard for measurement quality assurance, which was performed by routine measurements of the check standard and correlations of the measured profiles with the virtual standard, as shown in branch 2 in fig. 2. Another SRM bullet, numbered SRM 2460-002, was sent to the National Laboratory Center of ATF as a reference standard. After the topography measurements at NIST, all the SRM bullets were imaged at the National Laboratory Center of ATF using their reference IBIS under standard operating

conditions. A set of the best images was selected as the Golden Image. By acquiring images of the SRM bullets at local IBIS sites, and correlating the images with the Golden Image, differences in IBIS operating conditions between the local IBIS sites and the National Laboratory Center of ATF and other quality problems could be detected³.

NIST SRM bullets and cartridges, combined with the use of the NIST proposed control charts and control limits, are powerful tools for quality assurance of NIBIN acquisitions and correlations. During the NBIC project, several quality problems related to the operator and acquisition procedure, the IBIS software and correlation network, as well as the SRM cartridges themselves, were identified and have been successfully corrected⁴.

* Certain commercial equipment, instruments, or materials are identified in this paper to specify adequately the experimental procedure. Such identification does not

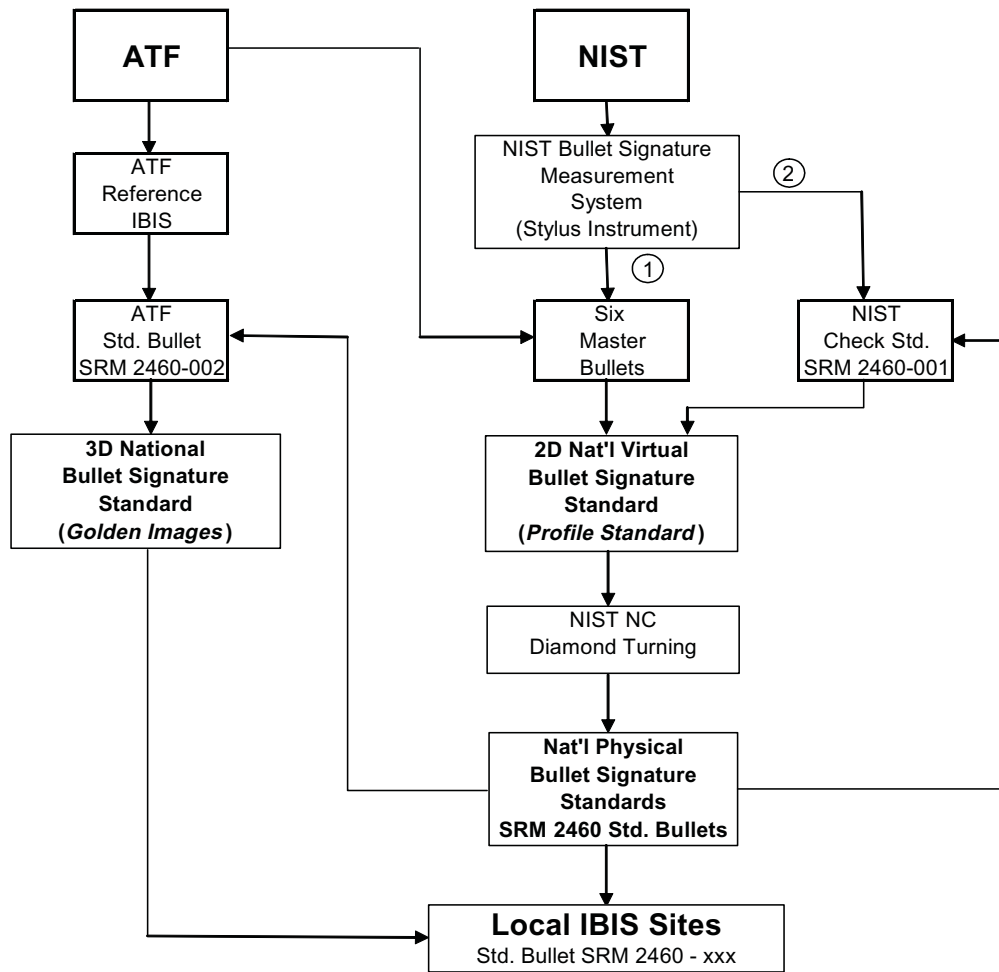


Fig. 2. Establishment of a Traceability and Quality System for NIST's Topography Measurements and NIBIN's Acquisitions and Correlations of Ballistics Signatures

imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.

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References

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- 2 Ibid.
- 3 Song J., Thompson R., Vorburger T. V. and all. The National Ballistics Imaging Comparison (NBIC) Project. (accepted for publication in the Forensic Science International.
- 4 Ibid.