OSAC Research Needs Assessment Form

Title of research need: Effect of New Technology on Quantitative Consecutive Matching Striae ID Criteria

Keywords: OCMS. striae. toolmarks. firearms. forensic science

Submitting subcommittee(s): Firearms and Toolmarks **Date Approved:** 29Jan16

(If SAC review identifies additional subcommittees, add them to the box above.)

Background information:

1. Description of research need:

Some firearm and toolmark examiners use the concept of Quantitative Consecutive Matching Striae as a criteria for identification. This concept is based on empirical data (see references), and comparisons conducted on comparison microscopes. Our subcommittee anticipates a shift towards the use of virtual microscopy of toolmarks captured using 3D technology. It would be of interest to know if the QCMS criteria withstands this new technology or if the criteria needs to be adjusted.

2. Key bibliographic references relating to this research need:

-Biasotti, A. A., "A Statistical Study of the Individual Characteristics of Fired Bullets", Journal of Forensic Sciences, Vol. 4(1), January 1959, pp. 34-50.
-Moran , B., Murdock , J. The Application of the Scientific Method to Firearm and Toolmark Examination AFTE J. Spring 2003;Vol 35(, #2), Spring 2003, (Appendix #2),: 234 – 240.
-Howitt D., Tulleners F., "A Calculation of the Theoretical Significance of Matched Bullets", Journal of Forensic Sciences, Volume 53, Number 4, July 2008, Pp.868-875.
-Biasotti, A., Murdock, J., and Moran, B. Chapter 35 "Firearms and Toolmark Identification", pp. 641-730 in Vol. 4, Modern Scientific Evidence: The Law and Science of Expert Testimony, 2011-2012 Edition (Faigman, DL, Blumenthal, JA, Sanders, J, Chen, EK, Mnookin, JK, and Murphy, EE.), Eagan, MN: Thompson-Reuters/West.

3a. In what ways would the research results improve current laboratory capabilities?

QCMS criteria has withstood decades of empirical use and study. This may not be the case if the emerging 3D capture technology has better resolution and visualization capabilities. It would be critical to know if the current QCMS criteria can still be used for virtual comparisons. It should be noted, that with this technology, newer comparison algorithms are likely to be developed in parallel. This may result in new criteria for identification that supplements or even replaces the QCMS criteria.

3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

(see 3a)

3c. In what ways would the research results improve services to the criminal justice system?

(see 3a)

4. Status assessment (I, II, III, or IV): III

	Major gap in current knowledge	**Minor** gap in current knowledge
No or limited current research is being conducted	**I**	**III**
Existing current research is being conducted	**II**	**IV**

This research need has been identified by one or more subcommittees of OSAC and is being provided as an informational resource to the community.

Subcommittee Approval date: 2/9/16 via Kavi Ballot

(Approval is by majority vote of subcommittee. Once approved, forward to SAC.)

SA

1. Does the SAC agree with the research need? Yes

2. Does the SAC agree with the status assessment? Yes

If no, what is the status assessment of the SAC:

Approval date: 17-Mar-2016

(Approval is by majority vote of SAC. Once approved, forward to NIST for posting.)