OSAC Research Needs Assessment Form

Title of research need: | Examiner Consistency During Friction Ridge Feature Mark-Up

Keywords: | Friction Ridge Analysis, Features, Mark-Up, ACE-V

Submitting subcommittee(s): | Friction Ridge | **Date Approved:**

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

Background information:

1. Description of research need:

(1) Perform additional studies related to the "Black Box" and "White Box" research. (2) Research on the Analysis phase of ACE-V (Analysis, Comparison, Evaluation, Verification), and specifically how modifications to feature mark-up, confidence level in mark-up, and the extent of those modifications prior to comparison (as well as during comparison) contribute to errors, as well as ways to mitigate errors. (3) Develop additional or refine existing tools to improve consistency in the interpretation of friction ridge images, feature selection, and decisions in ACE among examiners. The goal is to eventually understand the root causes of examiner variability and then implement standards and training to homogenize results while maximizing accuracy.

2. Key bibliographic references relating to this research need:

Please see Appendix "A" for a normative bibliography related to this research topic.

For a comprehensive and informative bibliography related to friction ridge examination please see Appendix "B": The 2011 SWGFAST response to the Research, Development, Testing & Evaluation Inter-Agency Working Group of the National Science and Technology Council, Committee on Science, Subcommittee on Forensic Science.

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

> Consistency of mark-up has the potential to lower risk associated with error rates. This will also allow for better standard operating procedures, and lead to developing a "check list" type of approach to the examination process. Training personnel will become easier and more effective if we understand how to increase the uniformity of these mark-ups.
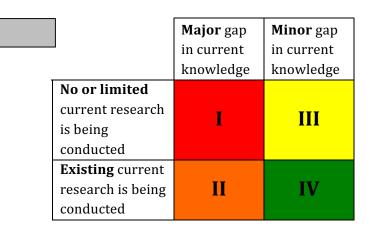
3b. In what ways would the research results improve understanding of the scientific basis for the subcommittee(s)?

> Research in this area will provide metrics regarding which steps and processes produce significant errors.

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

> Research will measure the value of mark-up consistency on evaluation decisions made by examiners.

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

	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: 01/29/2016

(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.)

APPENDIX "A"

Hicklin, R. A., Buscaglia, J., Roberts, M. A., Fellner, W., Burge, M. J., Monaco, M., Vera, D., Pantzer, L. R., C., Y. C., and Unnikumaran, T. N., "Latent Fingerprint Quality: A Survey of Examiners", Journal of Forensic Identification, vol. 61 (4), pp. 385-418, 2011.

Langenburg, G., "A Method Performance Pilot Study: Testing the Accuracy, Precision, Repeatability, Reproducibility, and Biasability of the ACE-V Process", Journal of Forensic Identification, vol. 59 (2), pp. 219-257, 2009.

Neumann, C., Champod, C., Yoo, M., Genessay, T., and Langenburg, G. (2013), Improving the understanding and the reliability of the concept of "sufficiency" in friction ridge examination, National Institute of Justice, Washington DC. https://www.ncjrs.gov/pdffiles1/nij/grants/244231.pdf

Swofford, H., Steffan, S., Warner, G., Bridge, C., Salyards, J., "Inter- and Intra-Examiner Variation in the Detection of Friction Ridge Skin Minutiae", Journal of Forensic Identification, vol. 63 (5), pp. 553-570, 2013.

Ulery, B. T., Hicklin, R. A., Buscaglia, J., and Roberts, M. A., "A Study of the Accuracy and Reliability of Forensic Latent Fingerprint Decisions", Proceedings of the National Academy of Sciences USA, 2011, http://www.pnas.org/cgi/doi/10.1073/pnas.1018707108.

Ulery, B.T., Hicklin, R.A., Kiebuzinski, G. I., Roberts, M.A., Buscaglia, J., "Understanding the sufficiency of information for latent fingerprint value determinations", Forensic Science International, vol. 230, pp. 99-106, 2013.Ulery, B. T., Hicklin, R. A., Roberts, M. A., Buscaglia, J., Measuring What Latent Fingerprint Examiners Consider Sufficient Information for Individualization Determinations. PLoS ONE 9(11), 2014.

Ulery, B. T., Hicklin, R. A., Roberts, M. A., Buscaglia, J., "Changes in latent fingerprint examiners' markup between analysis and comparison", Forensic Sci Int., 247, pp. 54-61, 2015.