

# OSAC RESEARCH NEEDS ASSESSMENT FORM



**Title of research need:** Examiner Consistency During Friction Ridge Markup

**Describe the need:**

(1) Perform additional studies related to the “Black Box” and “White Box” researches. (2) Research on the Analysis phase of the ACE-V (Analysis, Comparison, Evaluation, Verification), and particularly how modification to feature mark-up, confidence level in mark-up prior to comparison or during comparison influence (a) the decisions in the examination process, (b) the conclusions of the examination, and (c) the error rates. (3) Develop tools or improve existing ones, also by means of AI, to improve the consistency of friction ridge images interpretation through feature selection, mark-up, and assignment of the level of confidence, fostering decision consistency in ACE among the examiners. The objective is to measure the effects of examiners variability on the examination process, to understand the intervals of acceptable tolerances, in order to implement standards and training to homogenize results whilst maximizing accuracy.

**Keyword(s):** Friction Ridge Analysis, Features, Mark-up, ACE-V

**Submitting subcommittee(s):** Friction Ridge **Date Approved:** 2/1/2021

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

**Background Information:**

1. Does this research need address a gap(s) in a current or planned standard? (ex.: Field identification system for on scene opioid detection and confirmation)

Yes. This information will be useful in the Examination series of documents because it will provide empirical data to support (1) the consistency of suitability and sufficiency decisions, (2) the consistency of the results of examination among the examiners.

2. Are you aware of any ongoing research that may address this research need that has not yet been published (e.g., research presented in conference proceedings, studies that you or a colleague have participated in but have yet to be published)?

No, but some empirical data extracted from the European Network of Forensic Science Institutes, Fingerprint Working Group Collaborative Exercises Programme may provide some data of the variability of the mark-up of the examiners with a small set of data, and the effects of this variability to the examination results.

3. Key bibliographic references relating to this research need: (ex.: Toll, L., Standifer, K. M., Massotte, D., eds. (2019). Current Topics in Opioid Research. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-180-3)

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4. Review the annual operational/research needs published by the National Institute of Justice (NIJ) at <https://nij.ojp.gov/topics/articles/forensic-science-research-and-development-technology-working-group-operational#latest>? Is your research need identified by NIJ?

This research impacts "Determination of accuracy and reliability of forensic analyses and conclusions, including potential sources of error", "Development and validation of standardized forensic methods and conclusions", "Evaluation of the effectiveness of varied types of review and/or verification of casework, testimony, and investigative leads" and "Scientific foundations for expert conclusions of forensic evidence".

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

Better understanding of the effects of mark-up and confidence level variability of features during the Analysis phase or their reassessment during Comparison phase will improve the examination process decisions and results, lowering error rates, and will maximize the overall effectiveness of examiners.

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

Currently there is not a reliable assessment of the discriminating strength of specific friction ridge feature types. Standardization of the mark-up of friction ridge evidence is currently being studied. However, even if the mark-up of features in the "Analysis" phase of ACE-V were completely standardized, not knowing the weight of each feature type prohibits comprehensive standards for friction ridge evaluation decisions.

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

Services will be improved to the criminal justice system by increased consistency and accuracy of examination decisions.

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

II

	<b>Major gap in current knowledge</b>	Minor gap in current knowledge
<b>No or limited</b> current research is being conducted	<b>I</b>	<b>III</b>
<b>Existing</b> current research is being conducted	<b>II</b>	<b>IV</b>

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