OSAC RESEARCH NEEDS ASSESSMENT FORM

Title of research need:	Effects of contextual information during friction ridge examinations
Keywords:	ACE-V, cognitive factors, decision making

R&D Need Rank: Low, Medium, High	Medium	**SAC Approved Date:**	9/3/2025

Submitting subcommittee(s): Friction Ridge

Research Need Summary:

The purpose of these research needs is to build a stronger scientific foundation for forensic science standards. The information provided herein will help to evaluate and strengthen existing standards, and/or fill any standards related gaps. In the space below, please provide a brief narrative of the need to be addressed. This should include:

- The identity of any specific standards that would be affected/improved/evaluated
- A discussion on gaps that exist within the standards or standards related gaps that need to be filled
- How this work would fill those gaps
- An overview of any current or past research efforts that may be relevant to this effort
- A discussion regarding how this research might improve current laboratory capabilities and/or forensic services within the criminal justice system
- Any relevant references

ACE-V (analysis, comparison, evaluation and verification) is the process used among friction ridge examiners to conduct comparisons. Examiners are often subjected to specific information concerning a case and it has been questioned whether task-irrelevant information can lead an examiner to a preconceived notion about the case, suspect, victim, etc. Agencies around the world conduct casework differently depending on personnel, funding, and policy and procedures. For example, some agencies' friction ridge examiners also respond to crime scene calls, whereas others are shielded from these details.

Due to the variability in agencies' assigned roles and policy and procedures, this research would be valuable to understand whether any current practices are detrimental to criminal justice outcomes. If research provides evidence that cognitive factors negatively impact examiners, (e.g., exposure to particularly egregious crimes resulting in a tendency to make associative decisions), then agencies can incorporate additional QA steps in their SOPs to mitigate this risk.

There have been research attempts to study this topic, but more research is needed to adequately identify how cognitive factors affect an examiner's decision making.

Research in this area will provide foundational support for existing OSAC documents and their updates and may also support the development of new OSAC documents (such as specific recommendations for the sequential unmasking of information).

Informative References:

Langenburg, G.; Champod, C.; Wertheim, P. Testing for Potential Contextual Bias Effects During the Verification Stage of the ACE-V Methodology when Conducting Fingerprint Comparisons. *American Academy of Forensic Science.* 2009, Volume 54, Number 3, 571-582.

Additional research has provided insight how difficult it is to research cognitive factors and specifies detailed requirements to ensure these factors are accurately represented.

B. Growns, T. Neal, The Cambridge Handbook of Psychology and Legal Decision-Making. Chapter 13 Forensic Science Decision-Making, 2024.

Additional relevant references that highlight the need for this research include the following:

Busey, T., Yu, C., Wyatte, D., Vanderkolk, J., Parada, F., and Akavipat, R., "Consistency and Variability among Latent Print Examiners as Revealed by Eye Tracking Methodologies", Journal of Forensic Identification, vol. 61 (1), pp. 60-90, 2011.

Busey, T. A. and Dror, I. E., "Chapter 15: Special Abilities and Vulnerabilities in Forensic Expertise", in The Fingerprint Sourcebook, International Association for Identification, Ed. Washington DC: National Institute of Justice, 2011, http://www.ncjrs.gov/pdffiles1/nij/225335.pdf.

Busey, T. A. and Parada, F. J., "The Nature of Expertise in Fingerprint Examiners", Psychonomic Bulletin & Review, vol. 17 (2), pp. 155-160, 2010.

Dror, I. E., Champod, C., Langenburg, G., Charlton, D., Hunt, H., and Rosenthal, R., "Cognitive Issues in Fingerprint Analysis: Inter- and Intra-Expert Consistency and the Effect of a `Target' Comparison", Forensic Science International, vol. 208 (1-3), pp. 10-17, 2011.

Dror, I. E. and Cole, S. A., "The Vision in "Blind" Justice: Expert Perception, Judgment, and Visual Cognition in Forensic Pattern Recognition", Psychonomic Bulletin & Review, vol. 17 (2), pp. 161-167, 2010.

Dror, I. E. and Mnookin, J. L., "The Use of Technology in Human Expert Domains: Challenges and Risks Arising from the Use of Automated Fingerprint Identification Systems in Forensic Science", Law Probability and Risk, vol. 9 (1), pp. 47-67, 2010.

Dror, I. E., "The ambition to be scientific: Human expert performance and objectivity", Science & Justice, vol. 53 (2), pp. 81-82, 2013.

Dror, I, E., "Practical Solutions to Cognitive and Human Factor Challenges in Forensic", Forensic Science Policy & Management: An International Journal, vol. 4 (3-4), pp. 1-9, 2013.

Dror, I. E., Kassin, S., Kukucka, J., "New application of psychology to law: Improving forensic evidence and expert witness contributions", Journal of Applied Research in Memory and Cognition, vol. 2 (1), pp. 78-81, 2013.

Expert Working Group on Human Factors in Latent Analysis, "Latent Print Examination and Human Factors: Improving the Practice through a Systems Approach", U.S. Department of Commerce, National Institute of Standards and Technology, Washington DC, 2012.

Edmond, G., Tangen, J., Searston, R., Dror, I., "Contextual bias and cross-contamination in the forensic sciences: the corrosive implications for investigations, plea bargains, trials and appeals", Law, Probability & Risk, vol. 14 (1), pp. 1-25, 2015.

Fraser-Mackenzie, P., Dror, I., Wertheim, K., "Cognitive and contextual influences in determination of latent fingerprint suitability for identification judgments", Science & Justice, vol. 53 (3), pp. 144-153, 2013.

Hall, L., Player, E., "Will the introduction of an emotional context affect fingerprint analysis and decision-making?", Forensics Science International, vol. 181 (1-3), pp. 36-39, 2008.

Kassin, S., Dror, I., Kukucka, J., “The forensic confirmation bias: Problems, perspectives, and proposed solutions”, Journal of Applied Research in Memory and Cognition, vol. 2 (1), pp. 42-52, 2013.

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

Langenburg, G., Champod, C., and Wertheim, P., "Testing for Potential Contextual Bias Effects During the Verification Stage of the ACE-V Methodology When Conducting Fingerprint Comparisons", Journal of Forensic Sciences, vol. 54 (3), pp. 571-582, 2009.

Pacheco, I., Cerchiai, B., Stoiloff, S., “Miami-Dade Research Study for the Reliability of the ACE-V Process: Accuracy & Precision in Latent Fingerprint Examinations”, National Institute of Justice, Washington, D.C., 2014.

Swofford, H., Steffan, S., Warner, G., Bridge, C., Salyards, J., “Inter- and Intra-Examiner Variation in the Detiction 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., Roberts, M.A., Buscaglia, J., Measuring What Latent Fingerprint Examiners Consider Sufficient Information for Individualization Determinations. PLoS ONE 9(11): e110179. doi:10.1371/journal.pone.0110179, 2014.

Whitman, G., Koppl, R., “Rational bias in forensic science”, Law, Probability & Risk, vol. 9 (1), pp. 69-90, 2010.

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