OSAC RESEARCH NEEDS ASSESSMENT FORM

Title of research need:	Assessing the consistency and strength of friction ridge features
Keywords:	Features, suitability, quality, friction ridge skin, distortion, minutiae, reliability

R&D Need Rank: Low, Medium, High	High	**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

Multiple tasks support this research need: (1) Selection of consistent terminology to identify different feature sets, to include minutiae; (2) Develop and validate standard suitability and sufficiency criteria to support examination decisions based on the discriminating strength of features (friction ridge skin structures), including simultaneity; and (3) Research and develop tools based on the effectiveness and reliability of using automated latent impression quality scores to systematically determine suitability and to guide ABIS (Automated Biometric Identification System) searches.

Each of these tasks will be addressed independently:

1. Research has shown consistency within friction ridge examinations vary, especially based on examiners' decision-making. Recent research has also shown that examiners use varied terminology for the same minutia types and sometimes the same terminology for multiple types of minutiae. Other feature types also use varied terminology for the same feature (e.g. triradius vs delta). In order to provide ways to measure and set a standard for different features within an impression, examiners must be using the same terminology.
2. Currently, OSAC does not have a document that provides a complete suitability criteria to provide agencies with a uniform method to determine levels of suitability. Existing research has noted a lack of consistency concerning suitability decisions among examiners. Further research to include minutia type frequencies in different areas of friction ridge skin (distal phalange, medial and proximal phalanges, palms and feet) and different populations is needed. Research is also needed to address when it is appropriate to incorporate simultaneous impressions into suitability decisions.
3. There has been limited research on tools to provide calculated quality scores. Additional research is needed to ensure all features are included and different areas of friction ridge skin are represented. Lastly, different levels of distortion must be taken into account to allow accurate assessment of features under various conditions of distortion.

Overall, the tasks discussed above are imperative to support consistency in suitability decisions as well as an understanding of the strength of each feature. This would help to address criticisms based on the lack of consistency in the field and promote uniform criteria for suitability decisions.

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 on simultaneous impressions and the use of quality metrics).

Informative References:

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Additional relevant OSAC documents that highlight the need for more research:

OSAC - Proposed Standard for Feature Selection in Friction Ridge Examinations
ANSI/ASB – BPR 165 for Analysis of Friction Ridge Impression, 2024, 1st Ed.
ANSI/ASB – BPR 166 for Comparison and Evaluation of Friction Ridge Impressions, 2024, 1st Ed.
ANSI/ASB – Standard 014 for Friction Ridge Examination Training Program, 2024, 1st Ed.
ANSI/ASB – Standard 015 for Examining Friction Ridge Impressions, 2024, 1st Ed.
ASB – Standard -013 for Friction Ridge Examination Conclusions

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