Status Update

Friction Ridge Subcommittee

SAC Physics/Pattern

Henry Swofford

August 12, 2019

NIST
National Institute of
Standards and Technology
U.S. Department of Commerce

Strategic Roadmap

1. Provide baseline requirements to ensure friction ridge examinations are ***valid as applied***

2. Provide “best practice recommendations” to ensure friction ridge examinations are ***reliable***

3. Promote efforts to ***standardize*** the discipline across units and jurisdictions

National Institute of Standards and Technology
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Subcommittee Leadership

- **Chair:** Henry Swofford
  - HJS Consulting, LLC
  - Term expiration September 30, 2020
  - Email: hswofford@Hotmail.com

- **Vice Chair:** Thomas Wortman
  - Defense Forensic Science Center
  - Term expiration September 30, 2021
  - Email: Thomas.M.Wortman.Civ@mail.mil

- **Executive Secretary:** Maria Ruggiero
  - Los Angeles County Sheriff's Office
  - Term expiration September 30, 2019
  - Email: mcruggie@lasd.org

Subcommittee Breakdown

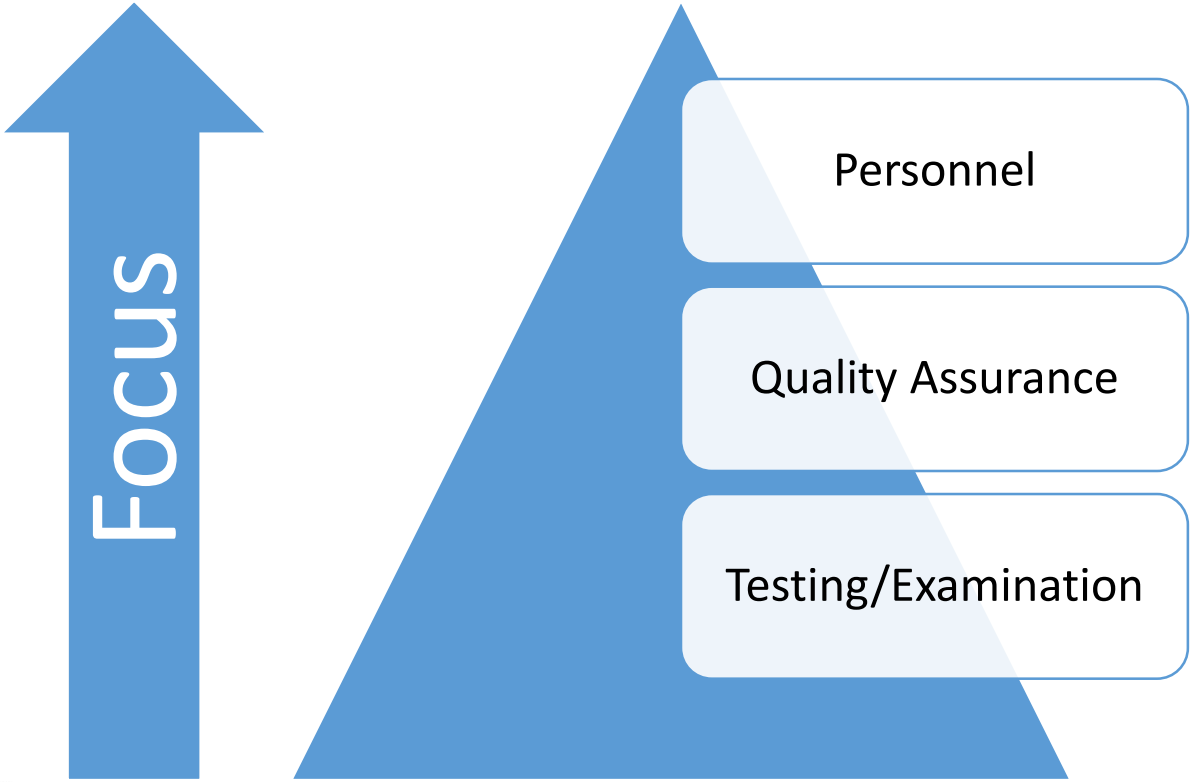
Category	Target	-	Current	-
Practitioner Total	14	70%	15	75%
Federal	4	20%	2	10%
State and Local	6	30%	9	45%
Civil and Other	4	20%	4	20%
Researchers and Scientists	4	20%	5	25%
R&D Technology	2	10%	0	0%

Subcommittee Membership

• Black, John P.	Black & White Forensics, LLC	2021	john@bwforensics.com
• Brock, Steven	Santa Clara County Sheriff's Office	2021	Steve.Brock@shf.sccgov.org
• Cole, Simon	University of California – Irvine	2021	scole@uci.edu
• Connelly, Joshua	Douglas County Sheriff	2019	joshua.connelly@douglascounty-ne.gov
• Eldridge, Heidi	RTI	2019	heidi.eldridge@icloud.com
• Small, Liz	FBI Laboratory	2020	eksmall@fbi.gov
• Hall, Carey	Minnesota Bureau of Criminal Apprehension	2019	carey.hall@state.mn.us
• Hornickel, Mandi	Illinois State Police	2020	Mandi.Hornickel@illinois.gov
• Kriel, Louis	Georgia Bureau of Investigation	2020	louis.kriel@gbi.ga.gov
• Cuellar, Maria	University of Pennsylvania	2021	mcuellar@sas.upenn.edu
• Pacejka, Andrew	Utah Bureau of Forensic Services	2021	apacejka@utah.gov
• Ruggiero, Maria C.	Los Angeles County Sheriff's Department	2019	mcruggie@lasd.org
• Schwarz, Matthew T.	Schwarz Forensic Enterprises, Inc.	2019	matt@schwarzforensic.com
• Smith, Ron	Ron Smith & Associates, Inc.	2020	ron@ronsmithandassociates.com
• Speckels, Carl	City of Phoenix Crime Laboratory	2020	carl.speckels@phoenix.gov
• Swofford, Henry J.	HJS Consulting, LLC	2020	hswofford@Hotmail.com
• Tabassi, Elham	National Institute of Standards and Technology	2021	elham.tabassi@nist.gov
• White, Alice	Evolve Forensics, LLC	2020	alicevirginiawhite@gmail.com
• Wortman, Thomas M.	Defense Forensic Science Center	2021	thomas.m.wortman.civ@mail.mil
• Zinn, Lisa M.	Orange County Sheriff's Crime Laboratory	2019	lzinn@occl.ocgov.com

Roadmap

- *Current* Strategic Priority:
  - Promulgation of standards and guidelines related to the **examination**, **interpretation**, and **reporting** of friction ridge evidence



Documents Completed (at SDO)

✓*ACE-V Process Map
✓*Best Practice Recommendation for Conflict Resolution
✓*Best Practice Recommendation for Verification
✓*Best Practice Recommendation for Technical Review
✓Standard for Friction Ridge Examination Conclusions
✓ Standard for Friction Ridge Examination Training
✓Guideline for the Articulation of the Decision-Making Process Leading to an Expert Opinion of Source Identification in Friction Ridge Examinations

- Document drafts publically available online:
  - https://www.nist.gov/topics/forensic-science/friction-ridge-subcommittee

Update → Standard for Conclusions

- Defines terms and qualitative expressions of source conclusions that may be reached following friction ridge comparisons.

- Five conclusion scale
  - Source Exclusion
  - Support for different sources
  - Inconclusive/Lacking Support
  - Support for same source
  - Source Identification

- Source Identification:
  - Strongest degree of association between two friction ridge impressions
  - Expressed as a “strength of evidence” statement

Update → Standard for Conclusions

- **Source Identification**: The strongest degree of association between two friction ridge impressions. It is the conclusion that the observations provide extremely strong support for the proposition that the impressions originated from the same source and extremely weak support for the proposition that the impressions originated from different sources.

- Source Identification is reached when the friction ridge impressions have corresponding ridge detail and the examiner would not expect to see the same arrangement of details repeated in an impression that came from a different source.

- **Qualifications & Limitations**: An examiner shall not assert that a source identification is the conclusion that two impressions were made by the same source or imply an individualization to the exclusion of all other sources.

Update → ACE-V Process Map

- Provides an interactive business process map illustrating the process of conducting friction ridge impression examinations.

- Salient Features:
  - Provides an interactive and illustrative interface for the friction ridge community
  - Codifies current practice (including various methods, approaches, and applications)
  - Identifies gaps and research needs for future practice
  - Dynamic document updating as the standards and best practices update

- NOTE: This process map is NOT an endorsement for methods. It is an illustration of the various ways friction ridge examinations are conducted today around the country. This map is a living document that will be updated as the OSAC moves toward standardizing a single way forward.

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Update → Conflict Resolution

- Describes the best practice recommendations for how to resolve conflicts between examiners during Verification or Technical Review:
  - *Remediating Interaction*
  - *Managerial discretion:*
    - *Blind verification*
    - *Consensus opinion*
    - *Outside agency examination*
  - *Documentation shall include:*
    - *All examiner conclusions*
    - *Images with markups of features observed to support decision/opinion*
    - *Date examined*
    - *Results of examination*
    - *Any changes of decision/opinion*

Update → Verification

- Describes the best practice recommendations for how to perform the verification steps during friction ridge impression examinations.
  - Verification considerations (e.g. extent, utility, case type, approach)
  - Types of verification and application options
  - Documentation

- Salient Features:
  - Verification should include an independent examination by another competent examiner (e.g. re-application of A-C-E)
  - Verification should apply to ALL decisions, including utility (suitability) decisions and examination conclusions
  - No studies exist on whether blind verification will detect more errors; however, general scientific literature suggests blind verification is a better approach.

Update → Technical Review

- Describes the best practice recommendations for how to perform the technical review of friction ridge impression examinations.

- Salient Features:
  - Technical review should occur in every case
  - Labs shall have a policy defining what is required in technical review
  - Technical review shall be documented in the case record
  - Labs shall have a policy to address non-conforming work
  - Non-conforming work shall be documented in the case record

Documents in Progress

- Examination Method
  - Analysis
  - Comparison/Evaluation
- Consultation
- Reporting Results
- ABIS Best Practices
- Terminology

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In Progress → Examination Method

- Prescribes minimum requirements for how examinations shall be conducted, documented, and justified based on clearly demonstrable and articulable criteria.

- Salient Features:
  - Labs shall have a procedure to define utility decisions and the criteria necessary to support (based on observed data)
  - Labs shall have a procedure to document the observed data relied upon to support utility decision
  - Labs shall have a procedure to define “complex” impressions, and required documentation for complex vs. non-complex.
  - Labs shall have a procedure to define the criteria necessary to support each source conclusion
  - Labs shall have a procedure to document observed data used to support the conclusion and changes in interpretations after exposure to the known impression
  - Labs shall have a procedure for routinely monitoring examiners’ ability to detect features, determine suitability, formulate source conclusions.

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In Progress → Analysis BPR

- Describes the best practice recommendations for how to perform the analysis steps during the examination of friction ridge impressions.

- Salient Features:
  - Utility/Suitability criteria (e.g. how much is enough?)
  - Feature selection and documentation of associated confidence
  - Complexity criteria (e.g. when is an impression “complex”)
  - Digital documentation recommended

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In Progress → Comparison & Evaluation BPR

- Describes the best practice recommendations for how to perform the comparison and evaluation steps during the examination of friction ridge impressions.

- Salient Features:
  - Method of comparison
  - Complex comparison criteria
  - Sufficiency criteria for conclusions (e.g. how much is enough?)
  - Assessment of similar and dissimilar characteristics between impressions
  - Assessment of the strength of the evidence
  - Determination of the appropriate conclusion
  - Documentation

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In Progress → Standard for Consultation

- Describes the minimum requirements for how to perform consultations during friction ridge impression examinations.

- Salient Features:
  - Preliminary observations shall be recorded prior to consultation (and shall not be provided to consulting examiner beforehand)

  - Consultation related to the following shall be documented:
    - Assessment of utility for comparison
    - Assessment of utility for AFIS search
    - Presence/absence of specific features during Analysis or Comparison
    - Simultaneity of Impressions
    - Assessment of complexity

  - For complex comparisons, a separate set of notes, annotations, or images generated by the consultant should be included in the case record.

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In Progress → Standard for Reporting Results

- Prescribes the minimum requirements that shall be included in friction ridge examination reports.

- Salient Features:
  - Method used to perform examination
  - Any deviations from approved methods, policies, procedures
  - Assumptions and limitations of any methods or procedures used to produce results
  - Statement if examinations were conducted, ABIS databases searched (and which ones)
  - Only comparisons which have been conducted shall be reported (e.g. must have actually done a comparison to render an exclusion)
  - Inconclusive/Lacking Support shall include a reason
  - Manner of expressing conclusions:
    - Expert opinion based on knowledge, training, and experience (KTE)
    - Expert opinion based on use of KTE and quantitative support from probabilistic models
    - Conclusions derived directly from and entirely dependent upon probability models

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In Progress → ABIS Best Practices

- Describes the best practice recommendations for effective uses of Automated Biometric Identification Systems (ABIS):

- Salient Features
  - Provides guidance to latent print and tenprint units
  - Stimulates further development of advanced capabilities by ABIS vendors
  - Addresses improvements to facilitate interoperability, including:
    - Acquisition of standards-compliant systems at the Federal, State and Local-Levels
    - Furthering connectivity efforts among law enforcement agencies
    - Improved governance structures to reflect the new interoperable environment
    - Developing mechanisms to test system performance and standards compliance
    - Expanded examiner training
  - Other ABIS related topics to improve performance and efficiency of friction ridge examinations

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In Progress → Terminology

- Describes the terms and definitions commonly used by the friction ridge examination discipline.

- Salient Features:
  - Intended to reside in the OSAC Lexicon Library
  - Intended to be dynamic and updated as appropriate
  - Searchable for easy user interface
  - Will be adapted from ISO/IEC 9000, 17025, or 17020, where practical

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Current Research Needs

- ACE-V Bias
- Assessing the Sufficiency and Strength of Friction Ridge Features
- Close Non-Match Assessment
- Examiner Consistency During Friction Ridge Feature Mark-Up
- Friction Ridge Statistical Modeling
- Latent Fingerprint Image Quality Usage

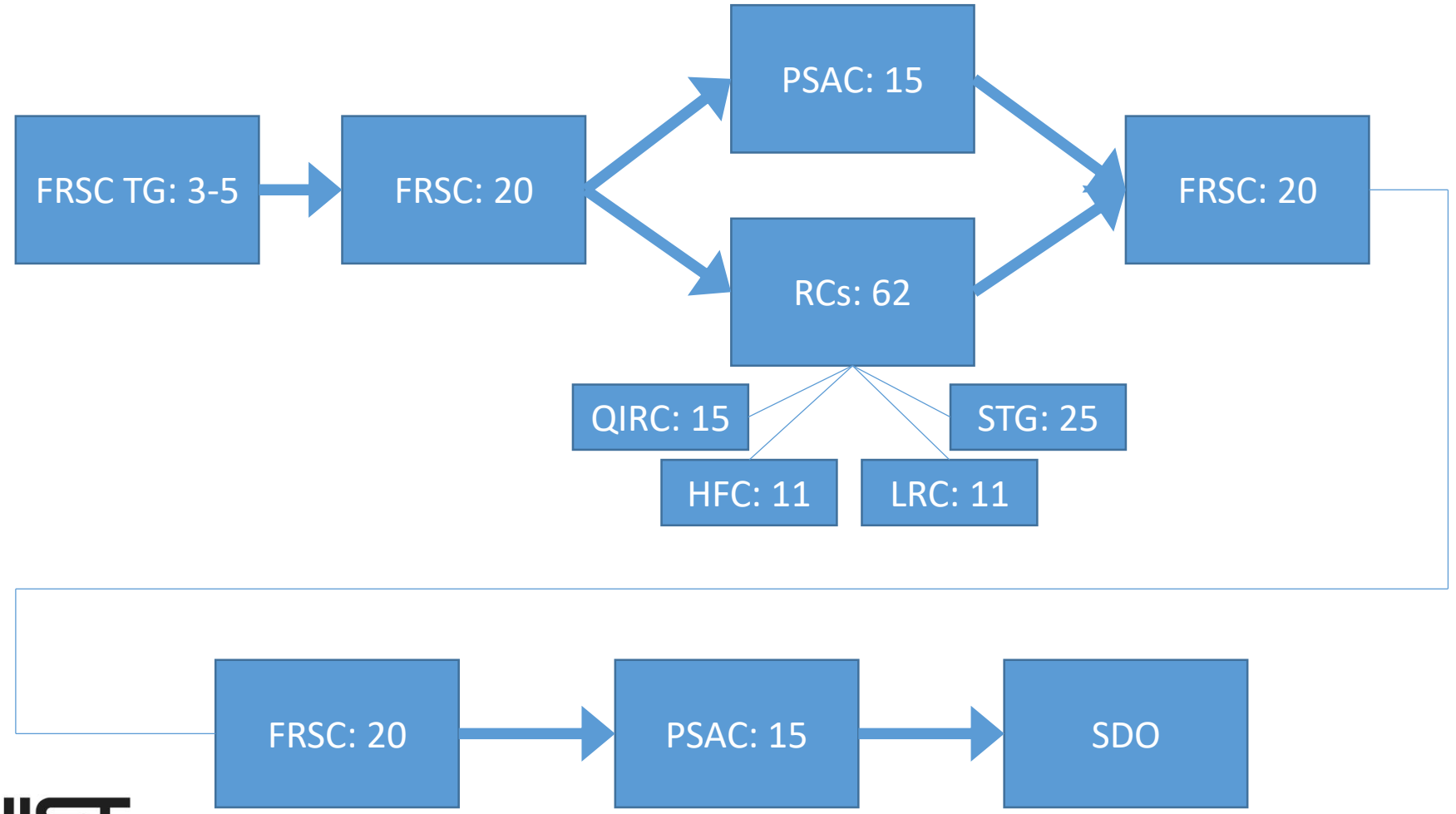
- Research needs publically available online:
  - https://www.nist.gov/topics/forensic-science/osac-research-development-needs

Additional Items of Interest

- ✓ OSAC FRS Response to PCAST
- ✓ OSAC FRS Response to the DoJ Proposed Uniform Language for Testimony and Reports
- ✓ OSAC FRS Response to the DoJ Forensic Science Discipline Reviews
- ✓ Discipline-Specific Baseline Documents (i.e. legacy SWGFAST documents)

- Documents publically available online:
  - https://www.nist.gov/topics/forensic-science/friction-ridge-subcommittee

General Process



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