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Best Practice

Recommendations for the Use of Automated Biometric Identification Systems (ABIS)

*Friction Ridge Subcommittee
Pattern/Impression Scientific Area Committee
Organization of Scientific Area Committees (OSAC) for Forensic Science*



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OSAC 2026-S-1051 Best Practice Recommendation for the Use of Automated Biometric Identification Systems (ABIS)

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Foreword

This document has been developed with the objective of improving the quality and efficiency of conducting ABIS searches by Forensic Service Providers (FSPs). In this document, the following verbal forms are used: “shall” indicates a requirement, “should” indicates a recommendation; “may” indicates permission; and “can” indicates a possibility or capability.

All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

Keywords: *abis, afis, database, search, tenprint, latent print, candidates, examination*

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Best Practice Recommendation for the Use of Automated Biometric Identification Systems (ABIS)

1 Scope

The Automated Biometric Identification System (ABIS) best practices document provides recommendations for Forensic Science Providers (FSP) that operate or use ABIS technology to capture, process, search, and adjudicate friction ridge impression comparisons.

The document does not address biometric modalities other than friction ridges. This document is not intended to replace or supersede relevant federal, state, local, or industry standards.

2 Normative Reference

2.1 ASTM International. (2021). Standard Practice for Latent Print Evidence Imaging Resolution (ASTM E3235-21). <https://www.astm.org/e3235-21.html>

3 Terms and Definitions

3.1 ABIS

The acronym for Automated Biometric Identification System. A generic term for a computer-based system which is a primary repository of individuals' biometrics (such as fingerprints, palm prints, facial and/or iris images) and secondary repository of associated demographic data, equipped with functionality to process biometric searches, store and retrieve records for identification purposes.

Note: This term has generally replaced the AFIS term to account for additional biometric modalities incorporated into modern systems.

3.2 automated fingerprint identification system (AFIS)

A generic term for a computer-based system which is a primary repository of individuals' friction ridge detail (such as fingerprints and/or palm prints) and secondary repository of associated demographic data, equipped with functionality to process biometric searches, store and retrieve records for identification purposes.

Note: This term has generally been replaced by the ABIS term or is colloquially interchangeable with ABIS. Refer to 'ABIS' for definition.

3.3 ABIS database

Repository of criminal or civil exemplar prints that can be searched to establish a link with existing records or establish a new biometric identity. The repository typically also allows for the search of latent prints associated with a criminal case to be searched against criminal records, civil records or the unsolved latent file (or vice versa).

Note: Refer to 'ABIS' for definition.

3.4**ABIS search**

Biometric data collected and searched through an ABIS to establish identity, link biometric records, and/or link an individual to forensic evidence. Common searches of friction ridge detail include tenprint-to-tenprint, latent-to-tenprint, tenprint-to-latent, and latent-to-latent. Note: Refer to 'ABIS' for definition.

3.5**ABIS tenprint record**

Impressions of friction ridge detail deliberately collected under controlled conditions for search, storage, or comparison in an ABIS. ABIS Tenprint Record refers to the collection of exemplar prints from all ten fingers and will typically include palm prints (see 3.12: exemplar print). Note: While other definitions of a tenprint record may be limited to impressions from fingers, the definition for this document is a technical term related to ABIS operations where the ABIS tenprint record may include palm print impressions, demographic data, and other biometric data.

3.6**biometric data**

Digital or analog representation of characteristics of an individual that can be used to establish or verify the identity of a person or to distinguish an individual as belonging to a subgroup of the entire population.¹

3.7**biometric record**

A biometric identity composed of one or more biometric modalities (e.g., friction ridge detail, face, iris, etc.) related to demographic data and/or criminal history data.

Note: ABIS technology allows for efficient search of biometric data stored in large databases.

3.8**certified products list (CPL)**

List of products certified by the FBI as tested and in compliance with the FBI's NGI Image Quality Specifications (IQS).²

3.9**closed search**

An ABIS search against a defined list of individuals (i.e., 1 to X, where X is a defined list of individuals). Closed searches of latent prints have been referred to as Case AFIS searches.

Note: For closed searches of latent prints, the defined list is typically composed of individuals who have already been associated with the criminal case and are not necessarily part of the ABIS

¹ Paraphrased from Mangold, K. (2016). *Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information ANSI/NIST-ITL 1-2011 NIST Special Publication 500-290 Edition 3.*, National Institute of Standards and Technology, Gaithersburg, MD, [online], <https://doi.org/10.6028/NIST.SP.500-290e3>, https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=921456 (Accessed November 26, 2023)

² FBI Programs, Research, and Standards Unit. (2023, November 22). *Certified Products List (CPL) – BioSpecs*. Federal Bureau of Investigation, U.S. Department of Justice. <https://fbibiospecs.fbi.gov/certifications-1/cpl>

database (e.g., persons of interest, persons with legitimate access to the crime scene or evidence).

Note: Refer to 'open search' and 'ABIS search' for definition.

3.10

composite-based ABIS

A composite-based system specifies a master record for each identity in the database. Incoming exemplar records update the master record such that the highest quality impression is included for each finger or palm print. The master record begins as the first record for an individual but becomes a composite of multiple enrollments for the person. Only the impressions in the composite record are searchable by the ABIS (as opposed to an event-based ABIS - see 3.12).

3.11

electronic biometric transmission specification (EBTS)

An FBI-published specification for electronically encoding and transmitting biometric images, identification, and data between federal, state, local users, and the FBI which specify file, record content, format and data codes.³

Note: Extends the ANSI/NIST ITL standard.

3.12

event-based ABIS

An event-based system searches one or more complete records in the database. Incoming exemplar records are added to the database, and the system determines how many and which records are searchable by the ABIS. This approach does not combine individual fingers or palms from different records (as opposed to a composite-based ABIS – see 3.10). Event-based systems may be configurable to establish specific records (e.g., newest, oldest, and/or highest quality records) or all records as searchable by the ABIS.

3.13

exemplar prints

exemplar impression

exemplar, known exemplar prints

The deliberately recorded images or impressions from the friction ridge skin of an individual.

Note: Examples may include inked tenprints, inked palm prints, Livescan prints, powder and lift prints, casted/molded prints, or photographs of friction ridge skin.

Note: Refer to 'ABIS tenprint record' for definition.

³ Criminal Justice Information Services Division. (2023, September 20). Electronic Biometric Transmission Specifications (EBTS) Version 11.2. Federal Bureau of Investigation, U.S. Department of Justice. https://fbibiospecs.fbi.gov/file-repository/ebts-v11-2_final.pdf/view

3.14**image quality specifications (IQS)**

Specifications from the FBI Criminal Justice Information Services (CJIS) Division that provide criteria for ensuring the image quality of fingerprint scanners and printers that input fingerprint images to, or generate fingerprint images from, the NGI system.⁴

3.15**latent****latent impression**

An impression from an unknown source of friction ridge skin, usually deposited on a substrate unintentionally. Typically, latent impressions are not readily visible and can be developed or enhanced by optical, physical, and/or chemical processing techniques.

Note: In the context of an ABIS, latent prints are typically collected at crime scenes or from physical evidence for search against large databases.

3.16**latent-to-tenprint search**

Latent impression searched against a database of existing ABIS tenprint records.

Note: Latent-to-tenprint searches typically attempt to link a latent impression from an unknown source to a biometric record.

3.17**latent-to-latent search**

Latent impression searched against an Unsolved Latent File.

Note: Latent-to-latent searches typically attempt to link a latent impression from an unknown source to other latent impression(s) from unknown source(s).

3.18**multiple searches**

ABIS searches of the same latent impression conducted more than once under different search parameters.

Note: Typically, multiple searches change one or more of the following conditions to improve search accuracy: encoded features, method of feature encoding, search parameters, types of search, database searched, or search of a different ABIS.

Note: Refer to 'repeat searches' for definition.

⁴ FBI Programs, Research, and Standards Unit. (2023, November 22). *Certified Products List (CPL) – BioSpecs*. Federal Bureau of Investigations, U.S. Department of Justice. <https://fbibiospecs.fbi.gov/certifications-1/cpl>

3.19**next generation identification (NGI)**

An electronic repository of biometric and criminal history information for the criminal justice community operated by the FBI's Criminal Justice Information Services (CJIS) Division. NGI replaces the FBI's Integrated Automated Fingerprint Identification System (IAFIS).⁵

3.20**open search**

ABIS search against an entire database without biographic parameters (i.e., 1 to N).

Note: Refer to 'ABIS search' for definition.

Note: Refer to 'closed search' for definition.

3.21**repeat searches**

ABIS searches of a latent impression that are resubmitted.

Note: Typically performed because system accuracy has improved after an upgrade or update to the ABIS or the ABIS search algorithms, or as deemed appropriate by an FSP.

Note: Refer to 'multiple searches' for definition.

3.22**tenprint-to-tenprint search**

ABIS tenprint records searched against a database of existing ABIS tenprint records.

Note: Tenprint-to-tenprint searches typically attempt to establish a link with existing records or establish a new biometric identity.

3.23**tenprint-to-latent search**

ABIS tenprint record searched against an Unsolved Latent File.

Note: Incoming tenprint records can be automatically or manually/deliberately searched against an Unsolved Latent File, in an attempt to associate a tenprint record/known source to previously unidentified latent impression(s) from unknown source(s).

3.24**type of transaction (TOT)**

One of several types of electronic submissions or responses accepted by FBI/CJIS, and each with a defined purpose, rules, and workflow.

Note: Examples of Types of Transactions defined by EBTS include the Criminal Tenprint Submissions and the Latent Friction Ridge Features Search.

⁵ Federal Bureau of Investigation. (2023). *Next Generation Identification (NGI) – LE*. U.S. Department of Justice. <https://le.fbi.gov/science-and-lab/biometrics-and-fingerprints/biometrics/next-generation-identification-ngi>

3.25**unsolved latent file (ULF)**

The database of latent impression features and related data compiled from previously searched but unidentified latent impressions.

Note: Supports Tenprint-to-Latent and Latent-to-Latent searches.

4 Requirements / Recommendations**4.1 General**

4.1.1 The FSP should ensure compliance with all relevant federal, state, local, and organizational standards, policies, and statutes, including those related to the following topics: those regarding security, privacy, data transfer, and data storage (e.g., juvenile or non-criminal biometric records). The FSP should also ensure that they are compliant with all relevant policies and protocols, including those related to training, certification, and access.

4.1.2 The FSP should define whether they operate and control an ABIS database and/or which ABIS databases they access and use. Some recommendations in this document only pertain to an FSP that operates an ABIS, but do not pertain to an FSP that only accesses and uses an ABIS. Due to variations in the structure, organization, and responsibilities of organizations that operate and/or use ABIS databases, each FSP should determine and document which recommendations are pertinent to them.

4.1.3 The FSP should appoint an ABIS or system administrator to oversee operations, develop policies, assign user roles, and serve as the main point of contact with the vendor.

4.1.4 The FSP should define the role for each user of the ABIS and set system permissions and access controls for each role, including the types of transactions that each role may access and/or process.

4.1.5 The FSP should ensure that users of the internal and/or external ABIS software or associated hardware receive training and have access to vendor-specific manuals or user guides. This training shall be sufficient for users to complete the tasks assigned to their role, including digital image training.

4.1.6 The FSP should have written procedures specifying the availability of external biometric systems for each type of transaction. The procedures should define the sequence of searches through internal and external databases.

4.2 Image Acquisition

4.2.1 When digitally capturing (e.g., Livescan, Mobile ID, card scanner, etc.) exemplar prints, the FSP should use products on the FBI's Certified Products List (CPL) that are in compliance with the Next Generation Identification (NGI) Image Quality Specifications (IQS). Whenever possible, devices should meet the FBI's most stringent standards.

4.2.1.1 The FSP should ensure that exemplar prints are captured at 1000 pixels per inch (ppi). If they cannot be captured at 1000 ppi due to system, storage, hardware, or bandwidth limitations, then the FSP should ensure that tenprint records and exemplar prints are captured at 500 ppi.

4.2.1.2 The make and model of the capture device should be included with each record such that the examiner can reference the information when the fingerprint images are viewed, printed, or exported.

4.2.1.3 The FSP should evaluate friction ridge capture devices on a schedule following manufacturer's recommendations or annually to verify that the devices meet quality expectations.

4.2.1.4 Digital images of friction ridge detail that have been printed to paper should not be digitally recaptured with a camera, scanner, or any other capture device. If it is necessary to recapture printed images, capture devices shall comply with FBI Image Quality Specifications (IQS) to ensure that digital images are printed at a 1:1 scale, and card printers shall be listed on the FBI Certified Products List (CPL).

4.2.2 When digitally capturing other friction ridge detail (e.g., latent prints) with devices or methods not included in the FBI's Image Quality Specifications, the FSP should confirm that the capture device is fit for purpose.

4.2.2.1 The FSP should ensure that images of friction ridge detail are captured at 1000 pixels per inch (ppi) or higher when sized at 1:1. If images of friction ridge detail cannot be captured at 1000 ppi due to system, storage, hardware, or bandwidth limitations, then the FSP should ensure that they are captured at 500 ppi or higher.

4.2.2.2 The FSP should evaluate the resolving power of each digital camera, scanner, and other capture devices annually and as needed according to the *ASTM Standard Practice for Latent Print Evidence Imaging Resolution (E3235-21)*.

4.2.2.3 The FSP should establish policies to ensure that digital images of friction ridge detail in ABIS software are not converted or altered in a destructive manner. Digital images of friction ridge detail that have been printed to paper should not be digitally recaptured with a camera, scanner, or any other capture device.

4.2.3 Exemplar prints and latent print images stored in an ABIS should be in a file format and at a compression ratio that meets or exceeds specifications listed in the most current revision of the *Data Format for the Interchange of Fingerprint, Facial & Other Biometric Information*.

4.2.3.1 The FSP should ensure that original versions of latent print images are maintained in the ABIS and/or in a separate digital image management system.

4.2.4 A scale should be included in the image of friction ridge detail captured with a camera (e.g., latent prints). If a scale is not included in the image, the spatial resolution should be estimated using objects of known size in the image or by the frequency of friction ridges in the image. Any size estimation method should be tested on sample images prior to use on casework.

images to confirm it is fit for purpose. Any size estimation method used shall be documented in the case record.

4.2.4.1 ABIS software should support the automatic and/or manual measurement of the spatial resolution of images based on a scale in the image and based on the frequency of friction ridges in the image.

4.3 Exemplar Enrollment and Search

4.3.1 The FSP should establish agency policies and standards for enrollment and search of ABIS tenprint records. The FSP should consider the following information to determine workflow steps and decision logic within the ABIS:

4.3.1.1 Record type (e.g., Criminal, Civil, Juvenile, etc.).

4.3.1.2 FBI/CJIS Type of Transaction.

4.3.1.3 Originating agency (e.g., law enforcement agency).

4.3.1.4 Method of import into system (e.g., interface with Livescan, inked card scan, file import, etc.).

4.3.1.5 Capture device type, make, model, and manufacturer (e.g., Livescan, inked card, etc.).

4.3.1.6 Quality of images and biometric data or errors detected (e.g., sequence error).

4.3.1.7 Minutiae count, finger pattern classification, number of amputated, bandaged, or unprintable fingers or palms, etc.

4.3.1.8 Additional factors that affect workflow steps should be clearly defined.

4.3.2 The FSP should document which steps of the exemplar enrollment process are completed manually and automatically. The FSP should also define the criteria that determine manual or automatic processing. Examples of criteria are listed above (Section 4.3.1).

4.3.3 The FSP should document the types of transactions that are supported by the ABIS and any restrictions on the types of transactions. The FSP should also clearly specify the types of transactions that are accepted from each submitter.

4.3.4 The FSP should document workflows of systems that interface with the ABIS to save, copy, forward, validate, or perform some other process on incoming enrollment records. Systems that interface with an ABIS include, but are not limited to the following:

4.3.4.1 Criminal history systems.

4.3.4.2 NIST readers.

4.3.4.3 Systems to validate descriptor data.

4.3.4.4 Systems to track non-criminal (civil) submissions for criminal history record dissemination and/or billing purposes.

4.3.4.5 Record archive systems.

4.3.4.6 Case management systems.

4.3.4.7 Quality assurance systems to detect submission errors or low-quality data.

4.3.4.8 Reporting tools systems.

4.3.4.9 Additional ABIS databases.

4.3.5 The FSP should define how transactions processed or searched by an ABIS are prioritized based on record type, crime type, or other considerations.

4.3.6 If a search of an ABIS tenprint record does not result in an identification, the FSP should use other biometric data (e.g., palm prints, face image, iris image, etc.) and/or demographic data (e.g., name, alias, date of birth, etc.) for additional searches to avoid creating multiple biometric identities of the same individual. If other biometric data results in an identification, the ABIS tenprint records should be compared manually (and linked), when appropriate.

4.3.7 The FSP should define the criteria for which tenprint search transactions are retained in the ABIS database.

4.3.8 The FSP should establish a policy for the process and frequency of repeat searches of ABIS tenprint records to improve database quality and accuracy⁶. The FSP policy should consider ABIS vendor recommendations and the following circumstances:

4.3.8.1 During or after an ABIS upgrade.

4.3.8.2 After an update to the ABIS matcher algorithms and/or feature extraction algorithms.

4.3.8.3 According to record type, crime type, or other relevant circumstances.

4.3.9 The FSP should establish policies for candidate list depth for each open search type in consultation with the ABIS vendor. This policy should seek to balance search success rate against agency resources.

4.3.10 The FSP should establish policies for the documentation or retention of search data and results for each type of ABIS search. Documentation should include the following information:

⁶ Over time, an ABIS database may develop duplicate identities (i.e. records of the same person saved as different people) and inaccurate associations (i.e., records of different people linked as a single identity). An internal search of a record against all other records improves database accuracy by detecting duplicate records and inaccurate associations.

4.3.10.1 System information (e.g., user ID, date, time, etc.).

4.3.10.2 Database searched and type of search.

4.3.10.3 For closed searches, the list of potential candidates.

4.3.10.4 Repeat searches.

4.3.10.5 Location and type of features used in the search (e.g., minutiae, cores, and deltas) and whether they were encoded manually or automatically.

4.3.10.6 Search filters and parameters.

4.3.10.7 For open searches, candidate list depth.

4.4 Latent Print Searches

4.4.1 The FSP should define criteria for determining the utility (suitability) of latent prints for ABIS searching and criteria for selecting which available ABIS databases to search. Criteria should include some or all of the following factors:

4.4.1.1 Utility for latent print comparison.

4.4.1.2 Latent print quality.

4.4.1.3 Latent print complexity.

4.4.1.4 Quantity of comparable features.

4.4.1.5 Quantity of features that can be encoded for ABIS search.

4.4.1.6 Anatomical area.

4.4.1.7 ABIS database size⁷.

4.4.1.8 Limitations of the ABIS⁸.

⁷ A larger ABIS database has an increased likelihood that the features in non-matching impressions may appear to correspond. This is most likely when one of the impressions is a latent print with a limited number of comparable features and/or reduced quality. An FSP should consider this risk when defining criteria for ABIS search of latent prints.

⁸ For example, an ABIS may have low accuracy for a certain type of search or certain searches may be very labor intensive. An FSP should consider these types of limitations when establishing criteria for ABIS search of latent prints.

4.4.1.9 Crime type.

4.4.1.10 Results of previous ABIS searches or comparisons.

4.4.1.11 Additional criteria defined by the FSP.

4.4.2 The FSP should document which ABIS databases (e.g., local, state, federal) are available for each type of transaction. The FSP should also establish a policy that specifies whether databases must be searched in a specific sequence.

4.4.3 The FSP should establish a policy for latent print closed searches against individuals associated with the case. Criteria for this policy should include the following conditions:

4.4.3.1 Unclear anatomical location or orientation in the latent print.

4.4.3.2 Large number of latent prints and/or exemplar prints.

4.4.3.3 As a quality assurance measure.

4.4.3.4 Verification or a part of the verification phase.

4.4.3.5 To assist in reaching a source exclusion decision.

4.4.4 The FSP should establish procedures that define when latent prints are retained or removed from the Unsolved Latent File based on crime type, relevant statutes of limitation, and/or other factors.

4.4.5 The FSP should establish a policy for the process and frequency of repeat searches of latent prints. The FSP policy should consider ABIS vendor recommendations and the following circumstances:

4.4.5.1 During or after an ABIS upgrade.

4.4.5.2 After an update to the ABIS matcher algorithms and/or feature extraction algorithms.

4.4.5.3 Before a latent print is removed from the Unsolved Latent File.

4.4.5.4 According to record type, crime type, or other case circumstances.

4.4.6 The FSP should establish a policy for cold-case and post-conviction review of unidentified latent print impressions and search through one or more ABIS databases. The policy should address latent prints that were never searched due to limitations of older ABIS technology, previous suitability determinations, or other factors that may have been affected by the prevailing state-of-the-art at the time a case was originally worked.

4.4.7 Other searches outside of standard workflows should be clearly documented (e.g., case notes) to include which images were searched, search parameters, and which database they were searched against.

4.4.8 The FSP should consult with the ABIS vendor and establish policies for the automatic and/or manual encoding of features in exemplar or latent prints.

4.4.9 The FSP should consult with the ABIS vendor and establish policies for multiple searches of latent prints. The policy should consider crime type, case circumstances, database size, print quality, system limitations, agency resources, and/or other factors.

4.4.10 The FSP should consult with the ABIS vendor and establish policies for when to apply search filters or parameters. Policies on ABIS search filters or parameters should consider the following criteria:

4.4.10.1 Search type (e.g., tenprint-to-tenprint, tenprint-to-latent, latent-to-tenprint, latent-to-latent, etc.).

4.4.10.2 Anatomical location (e.g., finger number or palm area).

4.4.10.3 Pattern or classification.

4.4.10.4 Print orientation (e.g., upright vs. 360°).

4.4.10.5 Record type (e.g., criminal, civil, etc.).

4.4.10.6 Person demographics (e.g., age, gender, race, etc.).

4.4.10.7 Geographic information (e.g., location of exemplar enrollment).

4.4.10.8 Use of multiple searches where filters or parameters are applied in one and not applied in another.

4.4.11 The FSP should establish policies for candidate list depth for each open search type in conjunction with the above search strategies and in consultation with the ABIS vendor. This policy should seek to balance search success rate against agency resources.

4.4.12 The FSP should consider vendor recommendations when establishing policies regarding latent print search criteria and search parameters to evaluate their efficiency and effectiveness and incorporate appropriate vendor best practices.

4.4.13 The FSP should establish policies for documentation of each type of ABIS search. Documentation should include the following information:

4.4.13.1 System information (e.g., user ID, date, time, etc.).

4.4.13.2 Database searched and type of search.

4.4.13.3 For closed searches, the list of potential candidates.

4.4.13.4 Whether latent prints are retained in or removed from the Unsolved Latent File.

4.4.13.5 Repeat searches.

4.4.13.6 Location and type of features used in the search (e.g., minutiae, cores, and deltas) and whether they were encoded manually or automatically.

4.4.13.7 Search filters and orientation option.

4.4.13.8 For open searches, candidate list depth.

4.5 Search Adjudication

4.5.1 The FSP procedures or protocols should clearly state that all examinations of friction ridge detail while using the ABIS software follow relevant standards and guidelines for friction ridge comparisons. For example, examinations of friction ridge impressions in ABIS should follow relevant standards and guidelines for Analysis, Comparison, Evaluation, and Verification.

4.5.1.1 The FSP procedures or protocols should clearly state any differences in process or decisions between standard examinations and examinations conducted with ABIS software. For example, examiners may reach a decision of “No Hit” or “Non Ident” in ABIS instead of the Source Exclusion opinion in standard examinations.

4.5.2 For ABIS tenprint records, the FSP should clearly document automation thresholds, candidate list depth, and other settings which affect the automatic and/or manual adjudication of internal and external searches. The FSP should evaluate these parameters annually and adjust, if necessary. When choosing or adjusting these parameters, the FSP should consider the following factors:

4.5.2.1 Analysis of the distribution of adjudications by score and candidate rank position for each search type to balance timeliness, thoroughness, and accuracy.

4.5.2.2 Balance of efficiency and time commitment for automatic and manual adjudication by search type.

4.5.2.3 Type of decision (i.e., “hit” vs. “no hit”).

4.5.2.4 Size, quality, and type of ABIS database.

4.5.2.5 Throughput volume of transactions.

4.5.2.6 Urgency or priority of transaction.

4.5.2.7 Human factors (e.g., task disinterest on transactions with low success rate).

4.5.2.8 Vendor recommendations, independent tests, and/or feedback from other FSPs with similar systems.

4.5.3 Implementation of automated adjudication using thresholds should undergo testing and validation with documented error rates and risks for false matches and missed matches. The quality and score thresholds or other decision criteria should undergo periodic review to confirm continued validity.

4.5.4 The FSP should document the results of tenprint adjudications and maintain that documentation for auditing purposes. Ideally, the FSP should ensure that the ABIS automatically maintains this information and supports the output of this data with periodic or on-demand reports. Documentation should include the following data:

4.5.4.1 System information (e.g., user ID, date, time, etc.)

4.5.4.2 Identifiers for all search and candidate records.

4.5.4.3 Score and rank of each candidate.

4.5.4.4 Examiner and/or system decision for each candidate.

4.5.4.5 List of candidates that were viewed by each examiner.

4.5.4.6 Additional information necessary to understand the ABIS search, results, and resulting decisions.

4.5.5 The FSP should document whether ABIS tenprint records are organized with a composite-based system, an event-based system, or a hybrid system.

4.5.6 The FSP should establish policies on the appropriate use of ABIS to maximize system and examiner efficiency and accuracy.

4.5.6.1 The FSP should establish a policy regarding the display of candidate rank and score information to the examiner. This policy should balance the improved accuracy from viewing this data against the potential for bias. The FSP should define quality assurance procedures (e.g., sequential unmasking or masking this data from a second examiner) to mitigate the risk of bias.

4.5.6.2 The FSP should establish guidelines on the use and display of system-generated corresponding minutiae. The guidelines should include vendor-specific information to assess risks based on system limitations

4.5.7 For latent prints searched in an ABIS, the FSP should clearly document automation thresholds, score differential, candidate list depth, and other settings which affect the automatic adjudication of internal and external searches, and when manual review and adjudication is required. The FSP should annually evaluate these parameters and adjust, if necessary. When choosing or adjusting these parameters, the FSP should consider the following factors:

4.5.7.1 Analysis of the distribution of adjudications by score and candidate rank position for each search type to balance timeliness, thoroughness, and accuracy.

4.5.7.2 Balance of efficiency and time commitment of automatic and manual adjudication by search type.

4.5.7.3 Type of decision (e.g., "hit" vs. "no hit").

4.5.7.4 Size, quality, and type of ABIS database.

4.5.7.5 Throughput volume of transactions.

4.5.7.6 Urgency or priority of transaction.

4.5.7.7 Crime type or case circumstances.

4.5.7.8 Quantity and quality of latent print detail.

4.5.7.9 Automated utility (suitability) determination.

4.5.7.10 Anatomical area of latent print detail or uncertainty in anatomical area or orientation.

4.5.7.11 Human factors (e.g., task disinterest on transactions with low success rate).

4.5.7.12 Vendor recommendations, independent tests, and/or feedback from other FSPs with similar systems.

4.5.8 The FSP should establish policies for the documentation of latent print searches in ABIS and their retention as part of case notes and/or in the ABIS. Documentation should include the following information:

4.5.8.1 System information (e.g., user ID, date, time, etc.).

4.5.8.2 Identifier, score, and rank for each candidate.

4.5.8.3 Examiner and/or system decision for each candidate.

4.5.8.4 List of candidates that were viewed by each examiner.

4.5.8.5 Status of each searched latent print in the Unsolved Latent File.

4.5.9 The FSP should establish policies regarding the release of ABIS search documentation as a part of disclosure. Although the information listed above is appropriate to disclose as a part of case notes, disclosure should not include the name of unidentified candidates, their biometric data, or their demographic information.

4.5.9.1 The FSP should follow all relevant privacy requirements and statutes established in their jurisdiction and by the relevant ABIS system.

4.5.10 If other processes are automated with ABIS technology, the FSP should document the purpose, criteria, and validation of these processes. The following are examples of these other processes:

4.5.10.1 Determination of suitability for ABIS search.

4.5.10.2 Determination of additional or enhanced quality assurance procedures.

4.5.10.3 Non-standard tenprint or latent print searches or comparisons (e.g., identity for DNA collection forms, pawn slips, etc.).

4.5.11 If the FSP releases preliminary latent print search results (e.g., investigative lead, “unofficial hit”, association) from the ABIS prior to review by a qualified latent print examiner,

the FSP should establish clear policies to define the automated human process, result criteria, authorized recipients of results, training for recipients, and limitations of automated results. Personnel receiving preliminary results shall be made aware of the preliminary nature of the results, so as to understand the limitations and the potential for error.

4.5.11.1 Implementation of automated results for latent print searching should undergo testing and validation with documented error rates and risks for false matches and missed matches. The candidate score threshold or other decision criteria should also undergo periodic review to confirm continued validity.

4.5.11.2 Preliminary results should be clearly labeled as such and include warnings that the results are for investigative purposes only and are not sufficient for arrests, warrants, or charges. Preliminary or automated results shall not include “source identification” or any of the opinions as defined in the OSAC Standard for Friction Ridge Examination Conclusions.

4.5.11.3 If official decisions or final reports are needed, the FSP should establish a procedure for these requests where latent print examiners use their standard protocols to complete the latent print examination and report the results to the requesting personnel.

4.5.12 The FSP should establish procedures to maintain an accurate ABIS database, including the following database maintenance methods:

4.5.12.1 Internal search of records in a database against all other records in the same database. Duplicate identities should be consolidated or reconciled after a manual or automatic review process established by the FSP.

4.5.12.2 External search of records in a database against an interfacing system.

4.5.12.3 If multiple biometric modalities are available in an ABIS, the FSP should use these other modalities to verify and improve the accuracy of the tenprint database.

4.6 Quality Assurance

4.6.1 The FSP should establish policies to conduct periodic quality assurance reviews for automated and manual ABIS activities in accordance with the needs of the system users and customers. Periodic reviews should include confirmation that data stored in separate systems is consistent and in sync.

4.6.2 The FSP should ensure that all relevant ABIS data is logged, including any data necessary to meet recommendations described in this document. The data should be available and exportable in a manner that facilitates quality assurance reviews.

4.6.3 The FSP should conduct periodic technical reviews on a random sample of records and transactions to evaluate the accuracy of the ABIS database, the suitability of established automated processes, thresholds, and criteria, and the accuracy of examiners individually and collectively.

4.6.3.1 In determining the number of random samples in each review, the FSP should define their sampling approach and consider the type of search, type of records, size of database, accuracy of system, level of acceptable risk, and other relevant factors.

4.6.3.2 During review, the FSP should focus on transactions with scores that do not align with the original decision (i.e., “Hit” with a low score or “No Hit” with a high score). ABIS reports or vendor-specific tools should support this type of review. The FSP should work with the ABIS vendor to establish this review process and determine ranges of ‘high’ and ‘low’ scores for each type of search.

4.6.4 The FSP that owns and controls an ABIS should establish an acceptance test plan to thoroughly test all equipment, hardware, software, workflows, processes, interfaces, and subsystems for expected functionality before the ABIS is used in production and after a system update or upgrade. Additionally, the FSP should establish a schedule to execute each section of the acceptance test plan at a specified date and/or frequency and define the criteria for acceptance.

4.6.4.1 The acceptance test plan should include processes to test and verify that the ABIS complies with all relevant standards and security requirements. The plan should also include tests sufficient to confirm that the ABIS meets all agency-defined requirements.

4.6.5 The FSP that owns and controls an ABIS should evaluate the system annually and after upgrades to the system, matcher algorithms, encoding algorithms, and other major subsystems. Evaluations should test that the following automated processes are stable, consistent with, or show improvement over previous tests of the ABIS:

4.6.5.1 Quality scores (e.g., NFIQ, NFIQ2, vendor-specific quality scores, etc.).

4.6.5.2 Friction ridge segmentation (e.g., rolled fingers, slap fingers, palms, etc.).

4.6.5.3 Automatic feature placement (e.g., minutiae, cores, deltas, etc.).

4.6.5.4 Matcher accuracy for each type of search.

4.6.6 The FSP should use sample data that is appropriate for testing purposes and should consider the following criteria when creating a test dataset:

4.6.6.1 The dataset should include a variety of data that represents the type and quality of data that is normally processed by the ABIS.

4.6.6.2 The dataset should be large enough to be statistically meaningful for the test performed.

4.6.6.3 The dataset should include probe samples that match records in the database and probe samples that do not match.

4.6.6.4 When possible, the FSP should use ground-truth matches and ground-truth non-matches in test datasets. If ground-truth samples are not feasible, the FSP should use a different biometric modality to confirm whether search and target samples originated from the same individual.

4.6.7 The FSP should establish criteria for applying enhanced quality assurance measures (e.g., blind verification, double verification, consensus decision, external agency verification, etc.) when a source identification decision follows an ABIS search and established conditions, such as the following:

4.6.7.1 The case contains a single identification decision that resulted from an ABIS search.

4.6.7.2 Latent print comparisons resulting from ABIS searches that were classified as complex per FSP policies.

4.6.7.3 Identification decisions resulting from an ABIS search where a significant proportion of the correspondence occurs near a delta or in a pattern-forced area.

4.6.7.4 Identification decisions from an ABIS search in high-profile cases.

4.6.7.5 Other conditions where the FSP determines that there is an increased risk of error.

4.7 Errors and Disaster Recovery

4.7.1 The FSP should have documented procedures to address record submission errors. The procedures should define who is responsible for resolving the errors (e.g., ABIS users, administrators, IT staff, vendor personnel, submitting agencies, etc.). Although it is not possible to anticipate every submission error, the documented plan should be sufficient to address common errors and investigate and document errors related to ABIS tenprint records.

4.7.1.1 Resolution of submission errors should include documentation to allow for system audits and updates to error resolution procedures.

4.7.2 The FSP should notify users and partner agencies if a submission error affects database accuracy with details describing resolution procedures and the potential risk of error, if any. Notification should occur for the following submission errors:

4.7.2.1 Validation errors on interfacing systems.

4.7.2.2 Records submitted in error.

4.7.2.3 Duplicate submissions.

4.7.2.4 Incorrect data associated with the record.

4.7.3 The FSP should have a documented plan to address system errors with the ABIS database and/or software. The plan should define who is responsible for resolving errors (e.g., ABIS users, administrators, IT staff, vendor personnel, submitting agencies, etc.). The plan should be sufficient to anticipate, identify, address, and resolve most system errors.

4.7.3.1 Resolution of system errors should include documentation sufficient to quickly resolve the same error if it reoccurs. This documentation should be efficient, consistent, and auditable.

4.7.4 The FSP should notify users and partner agencies if a system error affects system availability, accuracy, or integrity of the data with details describing the timeframe of the error and the potential risk of error. Notification should occur for the following system errors:

4.7.4.1 Network connection errors with submitting devices, the main ABIS database server, remote or partner agencies, and/or the state or federal ABIS.

4.7.4.2 Stagnant transactions.

4.7.4.3 Insufficient storage.

4.7.4.4 System errors from a separate, interfacing ABIS.

4.7.4.5 Data corruption.

4.7.5 The FSP that owns and controls the ABIS database should establish a robust plan to continue ABIS operations in the event of system disruptions. Plans should include relevant security requirements, business continuity management, and disaster recovery. The Continuity of Operations Plan should define the following information:

4.7.5.1 Continuity of data that includes complete backup of data off-site. Off-site backup should consider the timing of database backup by segment (e.g., ABIS tenprint records, latent print

records, etc.) to balance risk of loss, potential disruption of system, and available resources to preserve data.

4.7.5.2 Continuity of services to maintain system usability.

4.7.5.3 Minimum staffing at each location to maintain operations.

4.7.5.4 System hardware and equipment.

4.7.5.5 Networking resources.

Annex A**Bibliography**

This is not meant to be an all-inclusive list as the group recognizes other publications on this subject may exist. At the time these standards were drafted, these were the publications available to the working group members for reference. Additionally, any mention of a particular software tool or vendor as part of this bibliography is purely incidental, and any inclusion does not imply endorsement by the authors of this document.

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