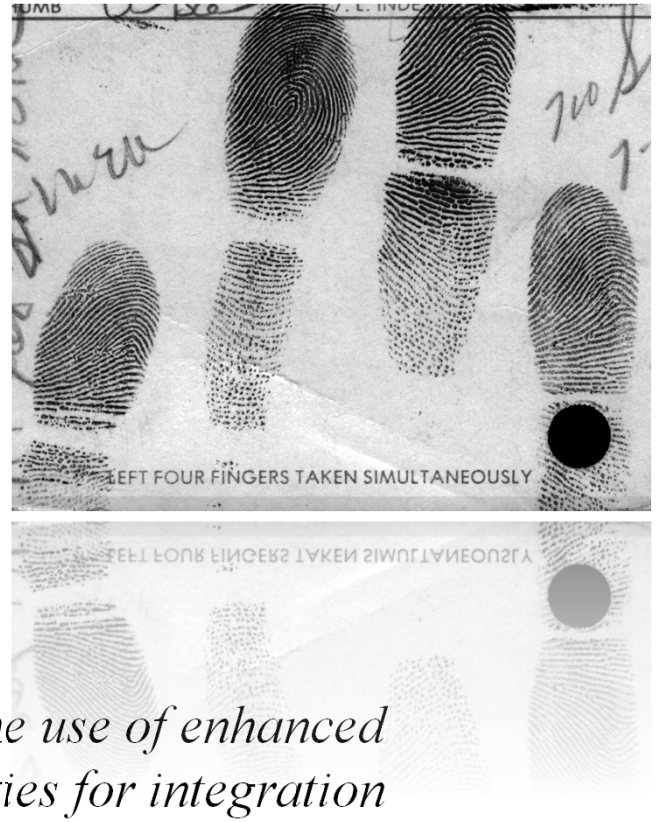
Federal Bureau of Investigation
Science & Technology Branch
Criminal Justice Information Services Division

Biometric Center of Excellence (BCOE)

International Association for Identification
100 Year - Centennial Celebration, August 2-8, 2015
Sacramento, California

Agenda

- **Mission & Focus**
- **Services & Standards**
- **Pilots & Prototypes**
- **Research & Development**



The BCOE explores and advances the use of enhanced biometric technologies and capabilities for integration into operations.

BCOE Mission

"To foster collaboration, improve information sharing, and advance the adoption of biometric and identity management solutions within the FBI and across the criminal justice and national security communities."

foster collaboration

improve information sharing

advance adoption

BCOE Focus

- Develops Biometric Prototypes, Pilots, and Toolsets
- Tests and Evaluates Biometric Technologies
- Promotes and Develops Biometric Standards
- Supports Biometric Best Practices
- Addresses Privacy and Policy
- Performs Research and Development

FBI Biometric Specifications (FBIBioSpecs) Web Site

FBIBioSpecs provides access to beneficial biometrics and standards-related information as well as information required for the successful transmission of biometric data to the FBI including:

http://fbibiospecs.cjis.gov

- Electronic Biometric Transmission Specification (EBTS)
- Certified Products List (CPL)
- Compression Information
- Fingerprint Standards
- Iris Pilot Information
- Latent Print Services
- Rapid DNA (R-DNA) Guidance

The BCOE manages the FBIBioSpecs Web Site providing the most up-to-date information on biometric standards and best practices.

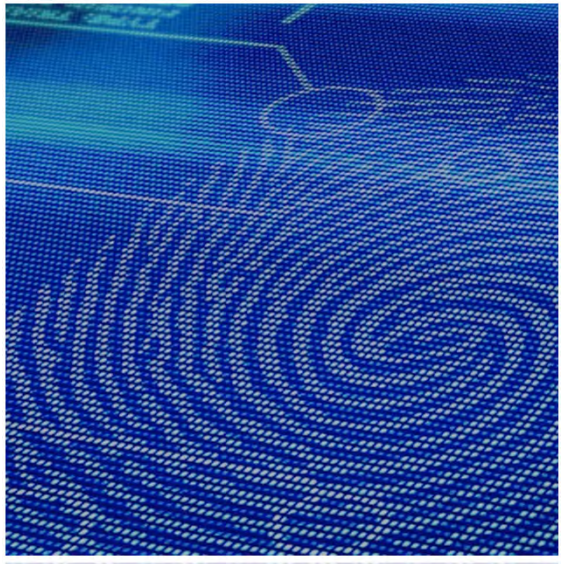
Electronic Biometric Transmission Specification (EBTS)

EBTS benefits federal, state, local, tribal, and international stakeholders with:

- *Consistent Communication*
  Users communicate with FBI systems using well-defined, interoperable messages which support a multitude of operations.

- *Increased Cooperation*
  Biometric and biographic identity information may be shared with authorized agencies.

- *Enhanced Electronic Submission*
  New message structures provide the ability to send high-resolution fingerprint, palm, face, tattoo, and iris images.



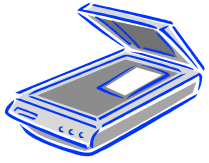
The EBTS and other FBI-sponsored standards are publically available online.

http://fbibiospecs.cjis.gov

Certified Products List (CPL)

Certifiable Products

Fingerprint Printer & Software



Card Scanner & Software

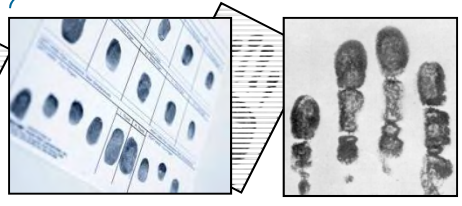
Fingerprint Scanners

Live Scanner & Mobile ID

Fingerprint Outputs or Inputs

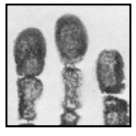
Ten-prints (card/paper) & palmprints

Ten-prints (card/paper) & palmprints



Ten-prints & palmprints

Plain prints only & palmprints



Variable number of fingers

Single finger

654 Certifications Received to Date

Compression Standards

500ppi

1000ppi

Wavelet Scalar Quantization (WSQ)

- Compression algorithm for 500ppi submissions
- Target compression ratio: 15:1
- Certified algorithms can be located at: ***http://fbibiospecs.cjis.gov***

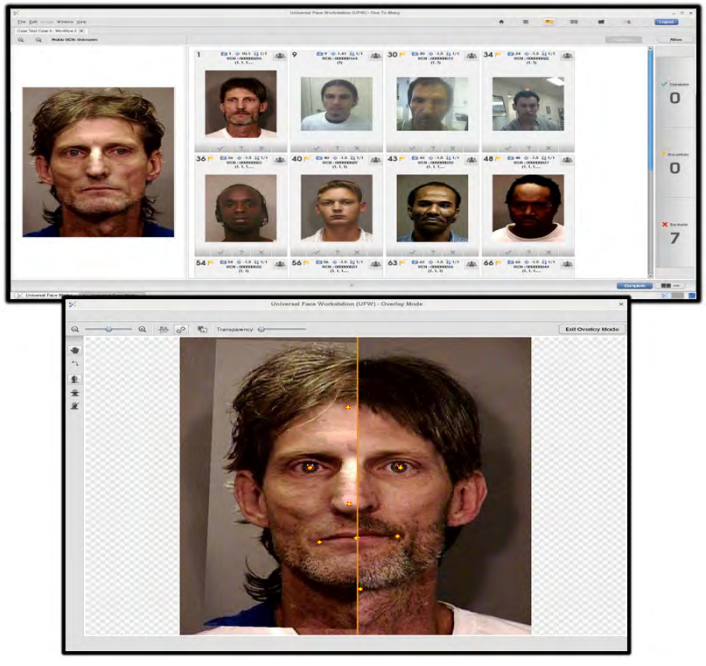
JPEG 2000 – *(Pending beta testing)*

- Compression algorithm for 1000ppi submissions
- Target compression ratio: 10:1
- Lossless compression for latent images
- NIST SP 500-300 (certification guidelines for JPEG 2000) published

Universal Face Workstation (UFW)

BCOE software to support access to Next Generation Identification (NGI) Face Pilot and NGI System search capabilities:

- Search preparation, submission and candidate list review
- One-to-one examination screen
- Cross Platform (Windows, OSX, Linux)

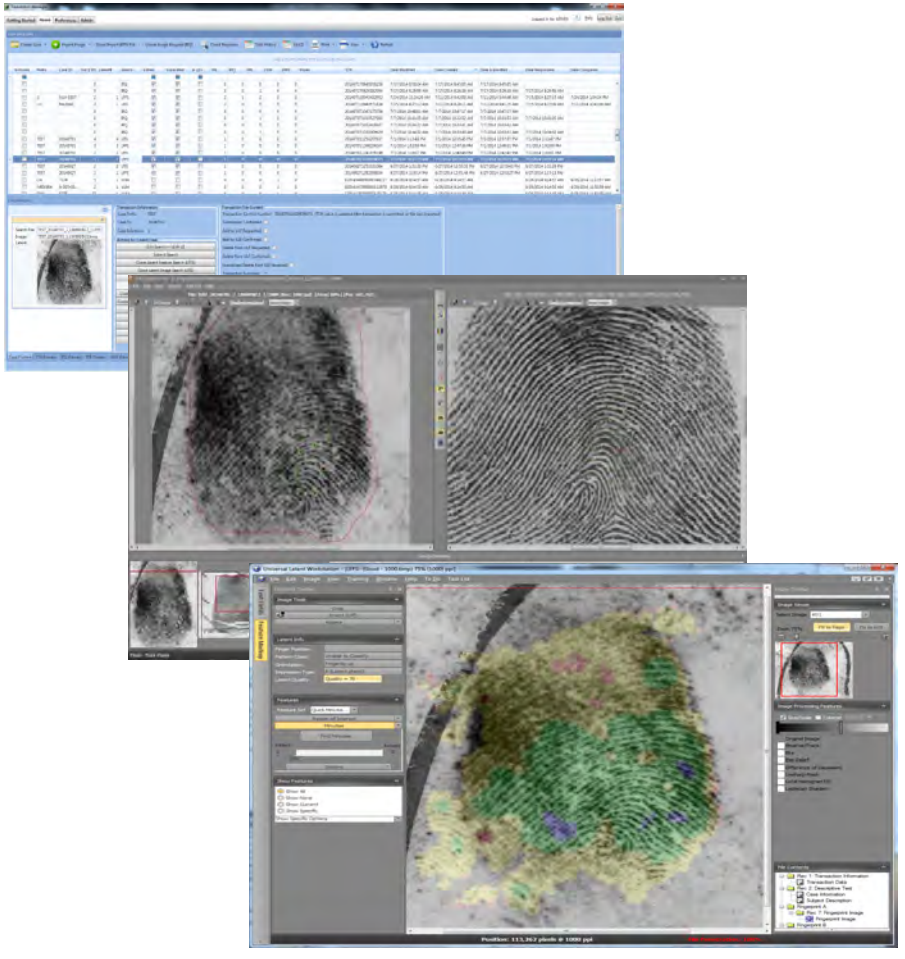


Available for authorized law enforcement use.

Universal Latent Workstation (ULW)

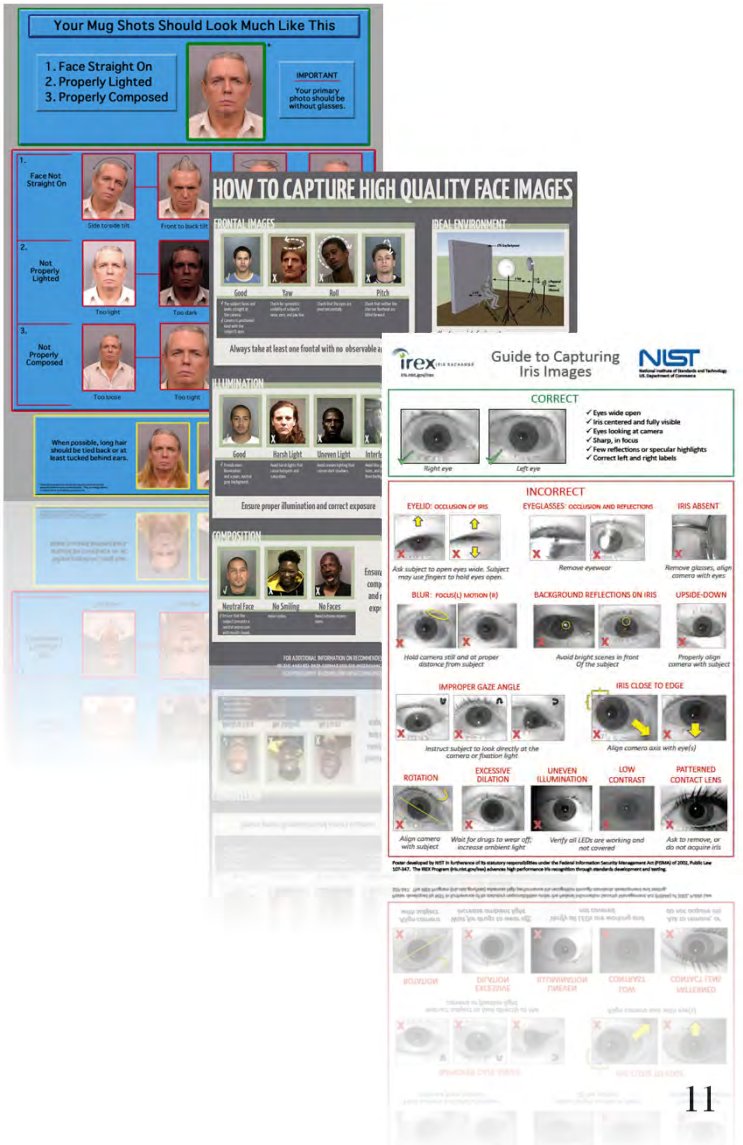
The ULW is the new generation of interoperable and interactive software for latent print examiners:

- Next step towards total standards-based workstations
- Provides the ability to search various Automated Fingerprint Identification Systems and the FBI's NGI with a single encoding leveraging the extended feature set
- Latent Quality Metrics
- 98% of external transactions sent to NGI are generated using ULW software



Best Practice for Capture

- Recommended best practices consistently produce superior results.
- Best practices are used to maintain quality as an alternative to mandatory standards.
- Available posters outline simple procedures to ensure the capture of high quality face and iris images.
- Best practices for fingerprint capture are located at *http://fbibiospecs.cjis.gov*



Iris Pilot: Concept and Capability

Concept:

- Build a nationally available iris image repository.
- Provide a high performance iris matching service.
- Develop standards for iris capture and transmission.
- Evaluate iris operations in realistic "large-scale" environment.

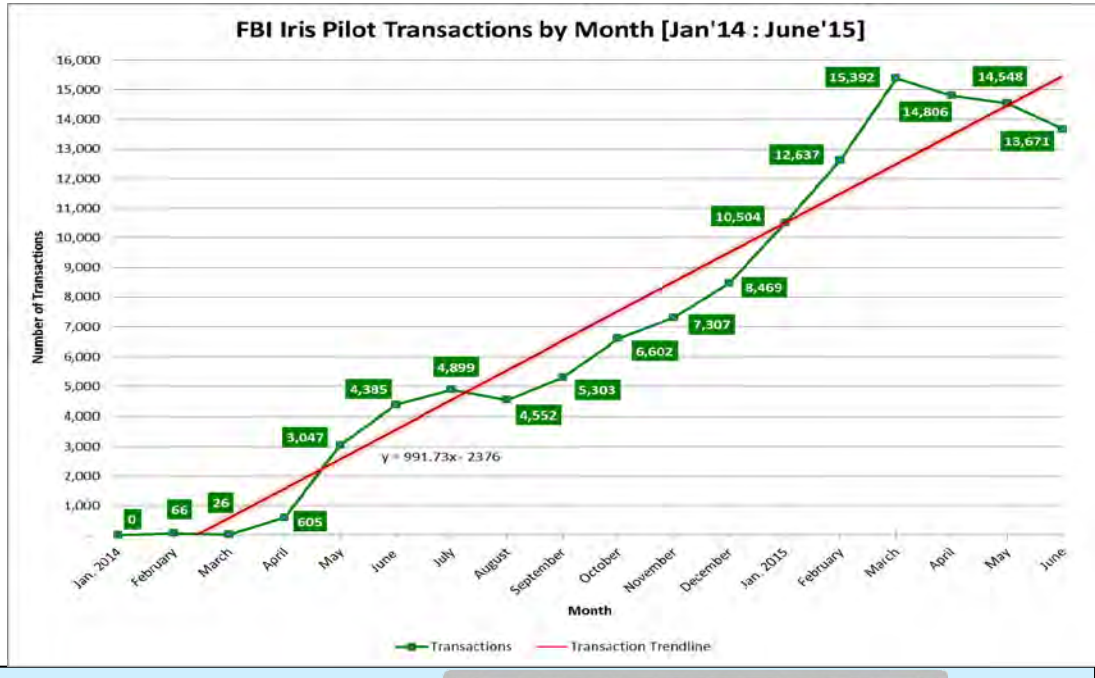
Capability:

- Enrollment Methods
  - Enrollment with Ten Print Record
  - Enrollment without Ten Print Record
  - Bulk
- Types of Searches
  - Iris Image Identification Submission (IIDS)
  - Iris Image Investigation Search (IIIS)

Iris possesses vast potential; it's quick, clean, accurate, scalable, and enhances criminal justice capabilities.

Iris Pilot Success

More than 300,000 iris enrollments during the life of the pilot.



Cascaded NCIC Search Results

- 6.2% of identifications hit on one or more NCIC files
- 2.2% of identifications included an outstanding want/warrant
  - 4 individuals had multiple wants/warrants
  - Offenses include: assault, burglary, DUI, larceny, & more
- 1.8% of identifications were sex offenders
- Identified three (3) deported criminals/aggravated felons
- Returned caution indicators: violent tendencies, escape risk, & more

Voice Technology Evaluation Project (VTEP)

Objectives:

- Determine the feasibility of voice as a biometric modality.
- Evaluate
  - Speaker recognition: One-to-One (1:1)
  - Investigative searching: One-to-Many (1:N)
  - Diarization (voice segmentation)

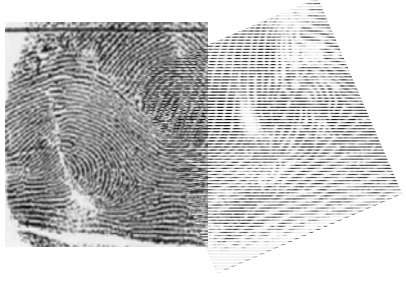
Applied Outcomes:

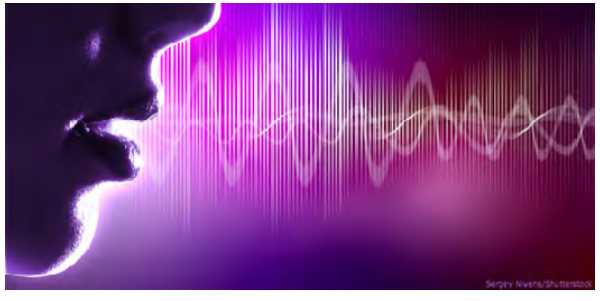
- Determine the accuracy and scalability of voice capabilities within private industry, government, and academia.
- Establish standards and best practices for capturing, transmitting, and processing voice information.

Voice offers a wealth of opportunity to identify terrorists and criminals.

Emerging Possibilities

- Media Processing Framework
- Defensive Biometrics
- Contactless Fingerprint Technology
- Compression Standards
- Face
- Scars, Marks, Tattoos, and Symbols
- Profile and Ear Recognition Technology





Contactless Fingerprint Technology

Contactless fingerprint scanning technologies offer <u>future potential advantages</u>:

- Higher quality fingerprint images
- Faster capture times
- Unattended fingerprint collection
- Reduced likelihood of contaminant spread among subjects

NIST - Contactless Fingerprint Capture Device Measurement Research Program:

- Objective to produce open testing methods, metrics, and artifacts
- Access to devices via Cooperative Research and Development Agreement (CRADA)
- Supports future certification of devices for inclusion on Government CPL

CRADA participation inquiries and questions may be submitted to fastcap@nist.gov

Facial Recognition Technology

The BCOE is focused on key areas based on operational impact:

Mitigating Facial Aging Impact

Determining the impact of face aging on facial recognition accuracy and producing tools to simulate and mitigate the effects of aging.

Increasing Recognition Accuracy

Improving performance of facial examination through the development of automated tools for matching unique facial features.

Advancing Human Comparison

Evaluating the statistical relevance of dermal marks to support one-to-one face examination techniques and expert testimony.

Scars, Marks, Tattoos, and Symbols Technology (SMTS)

Objectives:

- Collaborative effort with National Institute of Standards & Technology (NIST)
- Evaluate current technology to advance image-based tattoo matching
- NIST Tattoo Challenge (Tatt-C) Key Focus Areas:
  - Detection
  - Similarity
  - Identification
  - Region-of-Interest Based Matching
  - Mixed Media Recognition

The BCOE is committed to evaluating and enhancing SMTS capabilities across the criminal justice community.

Applied Outcomes:

- Tattoo Identification:
  Developing investigative leads
- Hybrid Image and Text Recognition:
  Advance techniques that use both image and text to boost tattoo recognition

Partnering for Success

CITeR

Questions/Comments

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