10-Print Capture
Scanner & Software Requirements

Version 0.9 DRAFT

Prepared by
Homeland Security 10-Print Capture User Group
Consisting of representatives from the
Department of Homeland Security
Federal Bureau of Investigation
Department of State
National Institute of Justice
Department of Defense Biometrics Fusion Center
National Institute of Standards & Technology

Discussion of Requirements - Agenda

- **Purpose of this discussion is to highlight requirements for which you submitted questions or comments.**
- **We have organized your questions and comments into requirements categories.**

General Goals

- **Meet the current space requirements (6”x6”x6”)** constraints of the deployment facilities.
- **Be mobile** so as to support multiple operational scenarios.
- **Perform all the ten print capture** processing steps including individual finger segmentation and image quality checks **within 5 seconds per slap,** from the time the subject places his/her fingers on the Scanner, to the moment the capture Software has segmented, analyzed image quality, and delivered status to the operator.
- **Be powered without an additional 120v power plug** in order to meet power capacity and power cabling constraints of the current facilities.
- **Comply with the current biometric industry standards**
- **Meet or exceed fingerprint quality requirements** contained in the latest version (7.1) of the Federal Bureau of Investigation’s (FBI’s) Electronic Fingerprint Transmission Specification, Appendix F

2.1 General Requirements

1. The Scanner and Software shall **capture the ten fingers using 2 four finger slaps and one 2 thumbs slap.**
2. The Scanner and Software shall support slap capture of **both identification slaps and individual finger flats.**
3. The Scanner and Software shall output fingerprint images **in accordance with format standards** identified in section 2.6, below.
4. The Scanner and Software should support **rolled fingerprint capture.**
5. The Scanner and Software shall be able to **auto sense or auto capture finger** when a finger is placed on it.
6. The Scanner and Software should have an **anti-spoofing capability** (e.g. live finger detection).
7. The Scanner shall be factory **calibrated** and shall provide automatic recalibration.
8. The Scanner should be **mobile** enough to be used by subjects who cannot reach the countertop.
9. The Scanner shall have the capability to be firmly **mounted on the counter-top.**
10. The Scanner shall operate in the following **environment**

- Temperature Range 35°F to 120°F (2°C to 49°C)
- Humidity Range 10-90% non-condensing; splash resistant
- Direct sunlight and/or in variable outdoor conditions.

2.2 Scanner Form Factor Requirements

1. The Scanner shall be no larger than the following dimensions: **Length 6", Width 6", and Height 6".**
2. The Scanner shall capture a slap size image of no less than **3.2 inches wide by 3 inches tall.**
3. The weight of the Scanner shall **not exceed 5 pounds.**
4. The Scanner shall have a **mean time between failure** of at least **5 years** of 7x24 operational use.
5. The Scanner shall have sealed, rugged container with **high tolerance for shock and vibration**
6. Other proper **human factor design** should be considered, for example, but not limited to
   - **tilting capture area** angle to increase pressure on the platen to achieve better print quality,
   - be designed to support both handheld and counter mounted use.
7. The Scanner should provide visible indication of power and status (e.g. off-line; ready, processing).

Scanner Interface and Drivers

1. The Scanner shall interface with Microsoft **Windows 2000 and Windows XP** environments.
2. The **power** for the Scanner shall be drawn from the desktop computer to which it is connected and **not require an additional 120v plug.**
3. The Scanner interface to desktop computers shall be supported through a **single, 6' cable** to provide both data transmission and power supply.
4. The Scanner shall be provided with **device drivers.**
5. The Scanner drivers shall run in **Microsoft Windows 2000 and Windows XP environments, in both 32 and 64** bit operating modes.
6. The Scanner shall support **upgrading and managing of the software/firmware** in the unit from the connected PC**.**
7. The Scanner shall be **UL certified.**

Scanner Fingerprint Image Quality

1. The Scanner image quality shall be certified to be in **compliance with or exceed the FBI's EFTS Appendix F Image Quality** Specifications (IQS) for Identification Flats.
2. A means should be provided to verify that the Scanner **continues to meet** EFTS Appendix F image quality requirements at operator selected intervals throughout the useful life of the Scanner.
3. The Scanner shall **eliminate the Halo Effect**: the effect of condensation from placing warm, moist fingers on the platen.
4. The Scanner should have the ability to capture print images when the fingers are **dry or wet.**
5. The Scanner shall be able to captures high quality fingerprint images **regardless of skin color or age** of the subject.
6. The Scanner and Software shall provide means to distinguish and **eliminate ghost** (residual latent fingerprint) **images.**

Software Requirements

1. The Software shall be in the form of a Software Development Kit (**SDK)** for easy integration with both **client** (PC with Scanner attached) **and server** (an application server without the Scanner attached) applications.
2. The Software, operating with the Scanner, shall deliver segmented, quality assessed and sequenced images to the client component in **no greater than 5 seconds** per step, from the moment the subject first touches the scanner platen, through capture of one of the three slap images.
3. The Software shall be provided with **sample source code and documentation** necessary to support development of client and server applications.
4. The Software shall run in **Microsoft Windows 2000, Windows 2003 Server and Windows XP environments,** in both 32 and 64 bit operating modes, as well as all major **Unix and Linux** variants**.**
5. The Software shall support **any approved Scanner.**
6. **T**he Software shall assess **overall slap quality**, including correct number of fingers captured, size and grayscale intensity of the fingers, fingers not truncated at edges, etc., in support of **auto-capture.**
7. The Software shall **segment** any single **four-finger slap** image into discrete, single-finger images.
8. The Software shall **segment** any single **two-thumb slap** image into discrete, single-thumb images.

Software Requirements, Continued

9. The Software shall **assess the fingerprint quality** of all individual fingerprint images
10. The Software shall **construct single two-thumb images** from discrete single thumb images.
11. The Software shall **distinguish between left and right hands** for any four-finger slaps.
12. The Software shall be able to distinguish **image sequence** (finger number) of the captured fingers.
13. The Software shall provide handling for hands that are not easily segmented such as **amputations and deformities.**
14. **T**he Software shall conduct quality checks that assess image quality and **provide the user with instant feedback.**
15. The Software should provide the capability to **interrupt a**uto sense or auto capture**.**
16. The Software shall **track source and version** of image quality modules in segmentation and sequence determination**.**
17. The Software shall support **java and C++** applications on the client, and **J2EE, C++, and .Net** applications on the server.
18. The Software shall provide a NIST and FBI-certified **WSQ** compression at selectable compression ratios (e.g. 10:1, 15:1)

Compliance to Standards

1. ANSI INCITS 358-2002, **BioAPI** Specification, http://www.bioapi.org/ - (note: it is anticipated that the interface between Scanner and Software may use a subset of the BioAPI specification. Both the Scanner and Software therefore should support BioAPI.)
2. CJIS-RS-0010 (V7.1), Electronic Fingerprint Transmission Standard (EFTS) (address **EFTS** support with compression) , http://www.fbi.gov/hq/cjisd/iafis/efts_70.pdf
3. ANSI/NIST ITL 1-2000, **Data Format for the Interchange of Fingerprint, Facial, & Scar Mark & Tattoo (SMT)** Information, http://www.itl.nist.gov/
4. IAFIS-IC-0010(V3), IAFIS Wavelet Scalar Quantization (**WSQ**) Grayscale Fingerprint Image Compression Specification, dated December 19, 1997.
5. ISO/IEC 15444 – Information technology – **JPEG** 2000 Image Coding System, http://www.incits.org/
6. **Fingerprint Image Quality**, NISTIR 7151, August 2004 http://www.itl.nist.gov/iaui/894.03/pact/pact.html

NOTE: The Software shall return image with **ANSI/NIST ITL1-2000/EFTS** format. It shall further allow selection of the compression to be applied (i.e., WSQ, JPEG2000, or none).