

Virginia State Police

Person Image (facial, scars, marks, tattoos and gang symbols) Requirements and Standards

A. Background

A statewide image capture and submission policy benefits agencies purchasing or upgrading photo imaging systems; it will aid those departments that wish to exchange digital images with other agencies by providing a standard by which images can be taken and shared. While all images taken in a given agency might be uniform in their appearance, the uniformity may not be consistent with photos from different agencies (backgrounds, image aspect ratio and digital resolution among other things vary). These differences could limit the value of the images and result in defense challenges to uses of images in court (for instance, poor lighting can create shadows causing facial images to look more sinister). To ensure compatibility, a set of common standards is needed. Statewide standards and guidelines should allow access to the FBI's upcoming Interstate Identification Index (III) Image System.

In 1993, the National Institute of Standards and Technology (NIST), along with the American National Standards Institute (ANSI), approved the ANSI/NIST standard. The most current version is known as the 'American National Standard for Information Systems - Data Format for the Interchange of Fingerprint, Facial, & Scar Mark & Tattoo (SMT) Information' (ANSI/NIST-ITL 1-2000). This standard helps to ensure uniformity in the capture and exchange of fingerprint, mugshot, and SMT images and data. Additionally, NIST has issued a "Best Practice Recommendation for the Capture of Mugshots" (version 2.0), which is attached at the end of this document. VSP has elected to use this recommendation (with one exception being a larger image file size) as the standard for photo images electronically captured and transmitted between to the state repository.

On January 1, 2006, Section 19.2-390, Code of Virginia was amended to require law enforcement agencies making reports to the CCRE to include a photograph of the individual arrested along with the fingerprints with its report. This requires the submission of an image, along with the fingerprints, of all persons arrested on or after January 1, 2006, for crimes reportable to CCRE.

More information about VSP's Live Scan and image project can be found on the VSP website:
http://www.vsp.state.va.us/cjis_livescan.htm

B. State Initiative: Centralized Person Image System

VSP is in the process of developing the requirements for a centralized image system, and it is envisioned the system will provide criminal justice users with the ability to request and retrieve images as well as perform lineups and create reports and announcements. This Image System is not intended to replace local systems. Participation would require compliance with the image requirements and standards in this document. In the meantime, VSP is able to accept digital images submitted with Live Scan arrest transactions and in the future, will be able to return images through VCIN as part of a criminal history record.

It is anticipated that part of the image system would include an investigative database with scar, mark, tattoo or gang (SMTG) information that would, when operational, allow a search based on SMTG descriptors. For example, an agency could query for a list of individuals with a blue eagle tattoo on the right arm. To build the database, SMTG information would have to be provided to VSP by criminal justice agencies when submitting arrest and other criminal justice data.

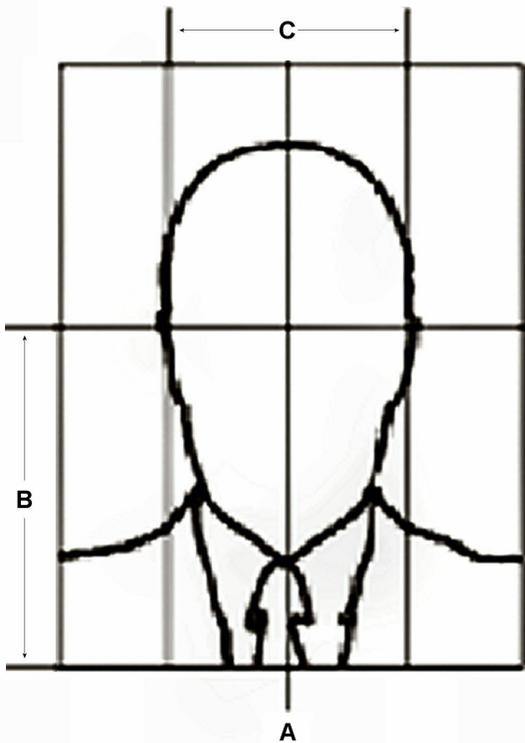
C. FBI Initiative: FBI National Image System

The FBI is accepting images as part of the Interstate Identification Index (III) portion of the FBI's Integrated Automated Fingerprint Identification System (IAFIS). As the use of integrated booking systems develops around Virginia, digitized images can accompany the digitized fingerprint data being sent to VSP from Live Scan or card scan devices. Adherence to the following Image Capture Guidelines will ensure the ability to successfully transfer data between agencies, allow for the establishment of "best practices" between agencies, and permit FBI acceptance of the images and related information.

D. Image Capture Requirements

These requirements are not designed to render current and legacy image collections unacceptable or obsolete; they are provided as a means of establishing or improving interoperability between image systems. For new images being captured, the specifications contained in this recommendation are equally applicable to real-time electronic capture of images as well as the electronic conversion of photographic images. For conversion of legacy files of photographs, most of the provisions of this recommendation are also still applicable.

VSP requires that agencies wishing to capture images adhere to the latest version of the Best Practices Recommendation (currently 2.0), initially developed at the Mugshot and Facial Image Workshop held in 1995, with one exception (a larger image file size). The complete text of the latest Best Practices Recommendation is included in the Appendices. The most pertinent aspects of this standard are given below:



CAPTURE REQUIREMENTS

- (A) At a minimum, always capture the centered, full-face pose, in focus, without glasses
- (B) The subject's eyes should be about 55% up from the bottom of the image
- (C) The distance between the subject's ears should be about half the width of the total image
- Use a minimum of three (3) point balanced lighting for subject illumination to eliminate shadows
- Use an 18% reflective gray background with a plain, smooth flat surface (paint formulas are given in the Appendices)
- Capture the image with the Width:Height aspect ratio of 1:1.25

TECHNICAL REQUIREMENTS for digital images

- The minimum number of 480 x 600 pixels in an electronic digital image (480 horizontal width x 600 vertical height)
- Color digital images represented as 24-bit RGB pixels (red, green, blue: 8 bits each)
- Use digital capture devices with a square pixel aspect ratio of 1:1.
- The compression algorithm is to conform to the JPEG Sequential Baseline.
- JPEG File Interchange Format (JFIF) will contain the JPEG compressed image data.
- Image file size will be between 80kb and 125kb (different than the NIST Best Practices recommendation)

Adherence to these requirements will ensure that photo images are comparable between agencies. This compatibility will be particularly important for those agencies that wish to make photo comparisons with images from other agencies.

It is required that a current image is captured for submission – it is unacceptable to reuse images that have been used in the past. Current images will provide important photographic evidence for investigators of changes over time as well as the best representation of an individual at that point in time.

E. Image Submission Requirements

It is required that the image be submitted with a criminal fingerprint record. If the record is transmitted by Live Scan, the image must be submitted with it. If the record is mailed, the image must be submitted with the fingerprint card. At present, VSP cannot accept images that are submitted without a criminal record; this is functionality that is being explored as a possibility with the Centralized Image Server.

If the fingerprint card is mailed in, the form located here:

http://www.vsp.state.va.us/cjis_livescan.htm (click on “Live Scan Documents, Forms and Tables”) must be completed and used to submit the image to VSP with the fingerprint card. Instructions for using the form are printed on the form.

F. Data Capture and Submission Guidelines

Data received with the image is as vital as the image itself. Without accurate or complete data, the image is virtually irretrievable. Many data elements pertaining specifically to images are optional, however it is important to include as many identifying images and data as possible to create a database that allows for the accurate identification of individuals. Taking the time to include as much information as possible (i.e, taking as many facial and scar, mark and tattoo images as possible and including complete data identifiers for the images) benefits the law enforcement community and promotes public safety.

G. Acceptable Image Examples



These images are small representations (in total size) of acceptable images. They are color images.

H. Electronic Interchange Standard

For the electronic interchange of images, VSP has adopted as a standard the ‘American National Standard for Information Systems - Data Format for the Interchange of Fingerprint, Facial, & Scar Mark & Tattoo (SMT) Information’ (ANSI/NIST-ITL 1-2000). VSP uses this standard for the transmission of images and data. Agencies that wish to transmit images to VSP or receive images from VSP in the future will be required to comply with this standard. VSP also utilizes this standard for transmission of images to the FBI IAFIS (III Section).

Agencies that contract for image systems need to ensure that the vendor complies with the current ANSI/NIST standard and the addendum.

Appendix A

BEST PRACTICE RECOMMENDATION FOR THE CAPTURE OF MUGSHOTS

Version 2.0

September 23, 1997

The original version of the "Best Practice Recommendation" was initiated at the Mugshot and Facial Image Workshop which was held in Gaithersburg, MD on October 23-25, 1995. Developed as a recommendation, the implementation of the practices and principles described in that document makes the conversion of existing and ongoing photographic collections more uniform. It contains a suggested set of procedures and equipment specifications for organizations considering the purchase of new systems or the upgrade of current systems. The recommendation is not designed to render current and legacy mugshot collections unacceptable. Rather, it is intended as a means of establishing or improving interoperability between mugshot systems.

The information contained in this updated revision of the "Best Practice Recommendation", Version 2.0, does not alter any of the individual points that were consensually agreed upon and included in the original version of this recommendation. It does provide additional details and clarifications for many of those points and has been supplemented with information regarding depth-of-field and exposure considerations.

This recommendation reflects a minimum set of common denominators. The provisions of this recommendation are keyed to the quality aspects associated with the unaltered captured mugshot image. For new mugshot images being captured, the specifications contained in this recommendation are equally applicable to realtime electronic capture of mugshots as well as the electronic conversion of photographic images. For conversion of legacy files of photographs, most of the provisions of this recommendation are also still applicable. In the future, it should be possible to add additional specifications without contradicting any of the current contents of the recommendation.

POSE

The full-face or frontal pose is the most commonly used pose in photo lineups and shall always be captured. This pose is in addition to profiles or intermediate angled poses captured to acquire perspective and other information. For subjects who normally wear eyeglasses, a frontal mugshot image should be captured of the

subject without glasses. This is required due to the glare from external illumination. An additional image can optionally be captured of the subject wearing eyeglasses.

DEPTH OF FIELD

The subject's captured facial image shall always be in focus from the nose to the ears. Although this may result in the background behind the subject being out of focus, it is not a problem. For optimum quality of the captured mugshot, the f-stop of the lens should be set at two f-stops below the maximum aperture opening when possible.

CENTERING

The facial image being captured (full-face pose) shall be positioned to satisfy all of the following conditions:

- The approximate horizontal mid-points of the mouth and of the bridge of the nose shall lie on an imaginary vertical straight line positioned at the horizontal center of the image.
- An imaginary horizontal line through the center of the subject's eyes shall be located at approximately the 55% point of the vertical distance up from the bottom edge of the captured image.
- The width of the subject's head shall occupy approximately 50% of the width of the captured image. This width shall be the horizontal distance between the mid-points of two imaginary vertical lines. Each imaginary line shall be drawn between the upper and lower lobes of each ear and shall be positioned where the external ear connects to the head.

LIGHTING

Subject illumination shall be accomplished using a minimum of three (3) point balanced illumination. Appropriate diffusion techniques shall also be employed and lights positioned to minimize shadows, and to eliminate hot spots on the facial image. These hot spots usually appear on reflective areas such as cheeks and foreheads. Proper lighting shall contribute to the uniformity of illumination of the background described in the exposure requirement.

BACKGROUND

The subject whose image is being captured shall be positioned in front of a background which is 18% gray with a plain smooth flat surface. A Kodak or other neutral gray card or densitometer shall be used to verify this 18% gray reflectance requirement.

EXPOSURE

The exposure shall be keyed to the background. Several areas of the recorded 18% gray background shall be used to verify the proper exposure. The averages of the 8-bit Red, Green, and Blue (RGB) components within each area shall be calculated. Each of the RGB means shall fall between 105 and 125 with a

standard deviation of plus or minus 10. Furthermore, for every area examined, the maximum difference between the means of any two of the RGB components shall not exceed 10.

ASPECT RATIO

The Width:Height aspect ratio of the captured image shall be 1:1.25.

MINIMUM NUMBER OF PIXELS

The minimum number of pixels in an electronic digital image shall be 480 pixels in the horizontal direction by 600 pixels in the vertical direction. It should be noted that the image quality of the captured mugshots and facial images will be improved as the number of pixels in both directions are increased. However, as images are captured with an increased number of pixels, the 1:1.25 (Width:Height) aspect ratio will be maintained.

Two considerations must be noted regarding this aspect of the recommendation. First, the normal orientation of many available cameras is the landscape format which specifies a greater number of pixels in the horizontal than in the vertical direction. Unless these cameras capture at least 600 pixels in the vertical direction, it may be necessary to rotate the camera 90 degrees. Second, the 480x600 capture format exceeds the VGA display format of 640x480. Therefore, at a minimum, an SVGA specification of 800x600 pixels will be required to display the facial image. The image will occupy less than the total number of available horizontal pixels.

COLORSPACE

Captured electronic color facial images are required. Digital images shall be represented as 24-bit RGB pixels. For every pixel, eight (8) bits will be used to represent each of the Red, Green, and Blue components. The RGB colorspace is the basis for other colorspace including the Y, Cb, Cr and YUV. Additional color management techniques are available from the International Color Consortium. Information regarding these techniques can be downloaded from the following URL: www.color.org

PIXEL ASPECT RATIO

Digital cameras and scanners used to capture facial images shall use square pixels with a pixel aspect ratio of 1:1.

COMPRESSION ALGORITHM

The algorithm used to compress mugshot and facial images shall conform to the JPEG Sequential Baseline mode of operation as described in the specification approved by the ANSI X3L3 Standards committee. The target size for a JPEG compressed color mugshot image file shall be 25,000 to 45,000 bytes.

FILE FORMAT

The JPEG File Interchange Format (JFIF) shall contain the JPEG compressed image data. The JFIF file shall then be part of the transaction file for interchange which conforms to the requirements as contained in ANSI/NIST-CSL 1-1993 and ANSI/NIST-ITL 1a-1997.

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Contact webmaster@magi.nist.gov with corrections/comments.

Appendix B

Paint formulas for the required 18% gray background

Background must be flat/smooth and 18% gray and if painting wood, it is recommended that a base or primer coat be applied before painting with the gray paint.

[Lowes](#): QUART SIZE Olympic Premium Interior Latex Eggshell, Base 3 - 72403, 101-1Y31.5, 109-8.5.

[Benjamin Moore](#): QUART SIZE Benjamin Moore & Co. Premium Interior Latex Flat Finish Wall Satin, Medium Base 215 2B, Formula: OY-8½ RX-3/4 BK-21 GY-4 WH-10, Area/Tint Code: B

Document Changes

Version	Date	Change
1.0	April 20, 2006	
1.1	September 7, 2006	Added "current image" requirement to end of Section D; added "Document Changes" list to end of document.