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# Minimum Training Criteria When Using Facial Recognition Systems

## Purpose

This document is intended to provide minimum training criteria for personnel who conduct facial comparisons using candidate images from automated facial recognition systems (FRS).

## 1. Introduction

1.1 An automated FRS typically provides a list of candidates from a database in response to a facial image query. The user of an FRS and the personnel reviewing the results are required to be aware of the major elements and limitations of the facial comparison discipline and training in the use of available tools. Results from an automated FRS are used as investigative leads only and should be used in conjunction with additional resources.

1.2 The intended audience of this document includes agencies and individuals utilizing an automated FRS to search an image or receive a candidate list.

## 2. Referenced Documents

### 2.1 *ASTM Standards:*<sup>1</sup>

E2916-19e1 Terminology for Digital and Multimedia Evidence Examination

E3149-18 Standard Guide for Facial Image Comparison Feature List for Morphological Analysis

### 2.2 *FISWG Standards:*<sup>2</sup>

FISWG Facial Image Comparison Feature List for Morphological Analysis

FISWG Glossary

FISWG Physical Stability of Facial Features of Adults

FISWG Guide for Role-Based Training in Facial Comparison

<sup>1</sup> For referenced ASTM standards, visit [www.nist.gov/osac/astm-launch-code](http://www.nist.gov/osac/astm-launch-code), or the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>2</sup> Available from Facial Identification Scientific Working Group (FISWG), <http://www.fiswg.org/documents>.

### 3. Terminology

#### 3.1 *Definitions:*

3.1.1 See *ASTM E2916 Terminology for digital and multimedia evidence examination terms*.

#### 3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *CSI effect*—the perception of the near-infallibility of forensic science in response to popular media.

3.2.2 *face recognition*—see facial recognition.

3.2.3 *facial recognition*— (1) the human cognitive process by which an observer identifies a person as being one they have seen before, (2) the automated searching of a facial image (probe) against a known collection resulting in a list of candidates ranked by computer-evaluated similarity score. This automated process is commonly referred to as a one-to-many comparison.

3.2.4 *holistic process*—the innate human ability of comparing faces by looking at the face as a whole without specifically considering the component parts in isolation.

3.2.5 *intentional alteration*—a temporary or permanent deliberate modification to the face (e.g., tattoos, piercings, make-up).

3.2.6 *unfamiliar faces*—Faces of unknown or recently learned people. Unfamiliar faces characterize almost all of face identification decisions made in forensic contexts, as the observer has no previous history with the person they are required to identify.

#### 3.3 *Acronyms:*

3.3.1 *CSI*—crime scene investigation

3.3.2 *FR*—facial recognition

### 4. Agency Considerations Related to Training

4.1 Agencies shall document completion of training and the competency of their users.

4.2 Agencies shall include competency testing as a component of training and quality assurance programs as a reliable means of measuring the quality of each user's ability to perform work. Competency testing measures individual performance and may help identify opportunities for continuing education and training.

4.3 The material provided below represents the minimum training criteria which may be tailored to meet the individual agency's operational needs. FISWG discourages the use of an FRS by users who have not successfully completed the minimum training and strongly encourages further user training beyond the minimum criteria. Resources for additional training information include, but are not limited to, FISWG Guidelines for

## Recommendations for Facial Comparison Training to Competency and FISWG Recommendations for a Training Program in Facial Comparison.

### 5. Training Recommendations

5.1 The user should be familiar with the history of facial comparisons in forensic science to include past methods and their shortcomings.

5.2 The user shall understand common terminology used in the discipline and be able to explain the following (including differences and limitations):

5.2.1 Human face recognition (familiar/eyewitness)

5.2.2 Automated face recognition

5.2.3 Holistic face processing

5.2.4 Unfamiliar face matching

5.3 The user shall demonstrate an understanding of the basics of image science including, but not limited to:

5.3.1 Human Vision (e.g., color, perception).

5.3.2 Photography (e.g., distortions, pose, illumination).

5.3.3 Components of digital images and compression (e.g., pixels, resolution).

5.3.4 Awareness of possible image alterations (intentional or unintentional).

5.3.5 Properties of video (e.g., limitations, formats, extraction of still images).

5.4 The user should be familiar with the proper handling of digital media, write protection of that media, and generating working copies.

5.5 The user shall understand the principles of comparison. These principles include:

5.5.1 Process of Analysis, Comparison, Evaluation and Verification (ACE-V).

5.5.2 Assessment of facial image quality to determine the value for comparison based on visibility of facial features.

5.5.3 The differences between class and individual characteristics.

5.5.4 Methods of Facial Comparisons

5.5.5 Morphological Analysis (the FISWG-recommended technique).

5.5.6 Superimposition (a technique which is only recommended by FISWG when used in conjunction with morphological analysis).

5.5.7 Photo-anthropometry and its limitations (a technique which is not recommended by FISWG for facial review).

5.5.8 Conclusion scale and levels of support relevant to facial review (e.g., exclusion, investigative lead)

5.5.9 Familiarity with scientific research related to the validity of facial comparison methods, including strengths and limitations of any empirical studies that have been conducted to test the accuracy of those methods.

5.5.10 Overview and effects of cognitive bias, to include confirmation bias.

5.6 The user should have a general knowledge of automated facial recognition systems, to include, but not limited to:

5.6.1 User input and operation.

5.6.2 System operation and output.

5.6.3 Facial recognition algorithm limitations including, but not limited to:

5.6.3.1 Imaging conditions (e.g., image quality, lighting, pose).

5.6.3.2 Obstructions and accessories (e.g., eyeglasses, jewelry, masks, scarves, head coverings).

5.6.3.3 Demographics performance variations.

5.7 The user should be familiar with basic image processing operations (e.g., brightness and contrast adjustments, rotations, cropping).

5.8 The user shall have a basic knowledge of the FISWG Facial Image Comparison Feature List for Morphological Analysis (see also, ASTM E3149-18 Standard Guide for Facial Image Comparison Feature List for Morphological Analysis).

5.9 The user should be aware of the variable nature of the human face over time and the physical stability of individual features as they relate to expression, time-related changes, weight change, changes in health and intentional alteration.

5.10 The user should be prepared to testify. Basic training for court testimony, including knowledge of individual agency policies and procedures is beyond the scope of this document and is the responsibility of the user's agency. However, users should be aware of the following:

5.10.1 Their agency's authorities and policies regarding acceptable use of FRS and dissemination of comparison information.

5.10.2 The response(s) of the legal system to the admission and use of facial recognition and identification, and the perceptions of the public to facial recognition and identification (e.g., "the CSI effect").

5.10.3 Proper chain of custody, documentation, notes, reporting of results, and technical review.

FISWG documents can be found at [www.fiswg.org](http://www.fiswg.org)