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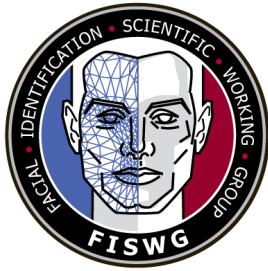
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Guideline for ACE-V Methodology in One-to-One Comparisons

1. Scope

1.1 The purpose of this document is to provide guidance for the use of Analysis, Comparison, Evaluation, and Verification (ACE-V) methodology in one-to-one facial comparisons.

1.2 This document describes the various steps within the methodology of ACE-V.

2. Referenced Documents

2.1 ASTM Standards¹:

E3149 Facial Image Comparison Feature List for Morphological Analysis

E2917 Standard Practice for Forensic Science Practitioner Training, Continuing Education, and Professional Development Programs

2.2 FISWG Documents²:

FISWG Glossary

¹ For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

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

13 FISWG Physical Stability of Facial Features of Adults

14 FISWG Facial Comparison Overview and Methodology Guidelines

15 FISWG Minimum Guidelines for Facial Image Comparison Documentation

16 FISWG Image Factors to Consider in Facial Image Comparison

17 FISWG Facial Images Comparison Feature List for Morphological Analysis

18 FISWG Image Processing Techniques for Facial Image Comparison

19 FISWG Facial Image Comparison Best Practices for Markups & Annotations

20 *2.3 Other Standards³:*

21 OSAC Standard Framework for Developing Discipline Specific Methodology for ACE-

22 V

23 OSAC 2022-S-0001 Standard Guide for Image Comparison Opinions

24 **3. Terminology**

25 *3.1 Definitions:*

26 *3.1.1 Analysis:* (1) the first step of the ACE-V method (2) the assessment of an image

27 to determine suitability for comparison, including the ability to discriminate significant

28 features.

29 *3.1.2 Comparison:* (1) the second step of the ACE-V method (2) the examination of

30 two or more samples to establish similarities and dissimilarities.

³ Available from Organization for Scientific Area Committee (OSAC) for Forensic Science, <https://www.nist.gov/organization-scientific-area-committees-forensic-science/osac-registry>

31 3.1.3 *Evaluation*: (1) the third step of the ACE-V method, where a practitioner
32 assesses the value of the details observed during the analysis and comparison steps
33 and reaches an opinion (2) ascertaining the value of dissimilarities and similarities
34 between two or more samples.

35 3.1.4 *Verification*: (1) the final step of the ACE-V method; (2) the review and
36 independent analysis of the conclusion of another practitioner.

37 3.1.5 *One-to-One comparison*: the direct comparison of facial features in one image
38 to facial features in another image by a trained practitioner.

39 3.2 *Acronyms*:

40 3.2.1 *ACE-V*: analysis, comparison, evaluation, and verification

41 **4. Significance and Use**

42 4.1 This document outlines the methods and criteria to be applied during a one-to-one
43 comparison.

44 4.2 The documentation of the ACE-V process during comparison should follow the
45 FISWG Minimum Guidelines for Facial Image Comparison Documentation.

46 **5. Applying ACE-V to One-to-One Comparisons**

47 5.1 *Analysis*: the step during which a practitioner considers the questioned image(s)
48 or known image(s) in terms of its properties and facial features to assess whether a
49 given image is suitable for comparison.

50 5.1.1 The practitioner should visually analyze the questioned image(s) before the
51 known image(s).

52 5.1.2 Visual analysis should include, but is not limited to the following considerations:

53 5.1.2.1 Imaging factors (see FISWG Image Factors to Consider in Facial Image
54 Comparison)

55 5.1.2.2 Image capture timeframe

56 5.1.2.3 Image alterations (e.g., filters, enhancements)

57 5.1.3 Subject factors (see FISWG Facial Images Comparison Feature List for
58 Morphological Analysis and FISWG Physical Stability of Facial Features of Adults)

59 5.1.4 Image processing tools may be used to aid in the analysis and suitability
60 determination.

61 5.1.5 It is beyond the capacity of this document to define the criteria that determine if
62 an image is suitable for comparison. For example, there is currently no established
63 criteria related to the quality of an image as it relates to facial comparisons.

64 5.1.6 If the images (questioned and known) are deemed to be suitable for
65 comparison, the practitioner will move on to the comparison step. The determination of
66 image suitability is based on the practitioner's subjective assessment of whether or not
67 an image has sufficient detail and comparability for a reliable and meaningful
68 examination.

69 5.2 *Comparison*: the step during which the practitioner conducts a visual side by side
70 comparison of facial images utilizing morphological analysis (see FISWG Facial Images
71 Comparison Feature List for Morphological Analysis) and considering physical stability

72 (see FISWG Physical Stability of Facial Features of Adults) to compare the facial
73 features.

74 5.2.1 Practitioners should note any similarities or dissimilarities, along with any
75 associated considerations where necessary (see step 5.1.2).

76 5.2.2 The practitioner may utilize image processing tools to aid in the Comparison
77 step. Image processing should be kept to a minimum as it may introduce artifacts to the
78 imagery or eliminate/alter facial characteristics (see FISWG Image Processing
79 Techniques for Facial Image Comparison).

80 5.2.3 The practitioner may produce visual aids in which they annotate images to
81 demonstrate the noteworthy facial features in the comparison (see FISWG Facial Image
82 Comparison Best Practices for Markups & Annotations).

83 5.3 *Evaluation*: The step during which a practitioner evaluates the clarity, quantity,
84 specificity, reproducibility, persistence, and the extent of observed similarities or
85 dissimilarities of facial features and expected variations to form an opinion⁴.

86 5.3.1 Expected variations that should be considered during the evaluation include,
87 but are not limited to:

88 5.3.1.1 Stability of features (see FISWG Physical Stability of Facial Features of
89 Adults)

⁴ See OSAC definition “view, judgment, belief – takes into consideration other information in addition to observations, data, calculations, and interpretations”

90 5.3.1.2 Imaging Factors (see FISWG Image Factors To Consider In Facial Image
91 Comparison)

92 5.3.2 During this step, the practitioner will reach an opinion by weighing the extent of
93 similarities or dissimilarities, and any expected variations in the facial images as
94 analyzed and compared in the previous steps.

95 5.3.3 At this time, there is no discipline-specific opinion scale for facial comparisons.
96 There is an OSAC Standard Guide for Image Comparison Opinions (OSAC 2022-S-
97 0001) that should be referenced when creating an opinion scale.

- 98 • Agencies should define the opinion scale utilized in conducting the facial
99 comparison to include the following:
- 100 • Consideration of alternative propositions (both the propositions of same source
101 and of different source).
- 102 • Criteria necessary to reach each of the opinions.

103 5.3.3.2 An opinion shall not be expressed as an absolute certainty. The following
104 words or phrases shall not be used when expressing an opinion: “‘individualize,’
105 ‘individualization,’ ‘identifies,’ ‘identification,’ ‘includes,’ ‘inclusion,’ ‘excludes,’ ‘exclusion’,
106 ‘to the exclusion of all others’.

107 5.4 *Verification*: The step in which the analysis, comparison, and evaluation steps
108 shall be completed by a second, independent practitioner. Verification can be performed
109 blindly (without knowledge of the other practitioner’s opinion) or non-blind (performed
110 with knowledge of the other practitioner’s opinion).

111 5.4.1 A statement of verification (all opinions) shall be included within the
112 documentation (see FISWG Minimum Guidelines for Facial Image Comparison
113 Documentation) of a requested comparison. This documentation should be completed
114 by all practitioners who have rendered an opinion of the same requested comparison.
115 The number of practitioners verifying may vary and be agency specific.

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118 FISWG documents can be found at: www.fiswg.org

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