

Training Guidelines for Video Analysis, Image Analysis and Photography

*Video/Imaging Technology & Analysis Subcommittee
Digital/Multimedia Scientific Area Committee
Organization of Scientific Area Committees (OSAC) for Forensic Science*



OSAC Proposed Standard

Training Guidelines for Video Analysis, Image Analysis and Photography

Prepared by
Video/Imaging Technology & Analysis Subcommittee
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Disclaimer:

This document has been developed by the Video/Imaging Technology & Analysis Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science through a consensus process and is *proposed* for further development through a Standard Developing Organization (SDO). This document is being made available so that the forensic science community and interested parties can consider the recommendations of the OSAC pertaining to applicable forensic science practices. The document was developed with input from experts in a broad array of forensic science disciplines as well as scientific research, measurement science, statistics, law, and policy.

This document has not been published by an SDO. Its contents are subject to change during the standards development process. All interested groups or individuals are strongly encouraged to submit comments on this proposed document during the open comment period administered by ASTM International (www.astm.org).

1 **Ballot Rationale: This document provides training guidelines**
2 **and recommendations to assist organizations in designing a**
3 **training program for forensic video analysts, image analysts,**
4 **and photographers to ensure competency in the completion of**
5 **forensic tasks and analyses.**

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7 **Training Guidelines for Video Analysis, Image Analysis and**
8 **Photography.**

9 This standard is issued under the fixed designation X XXXX; the number immediately following the designation
10 indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses
11 indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or
12 reapproval.

13 **1. Purpose**

14 1.1. The purpose of this document is to provide guidelines and recommendations to assist
15 organizations in designing a training program for forensic video analysts, image
16 analysts, and photographers to ensure competency in the completion of forensic tasks
17 and analyses.

18 **2. Scope**

19 2.1. This document will recommend topics and guidelines for training within the disciplines
20 of video analysis, image analysis, and photography as a supplement to the "Standard
21 Practice for Forensic Scientist Practitioner Training, Continuing Education and
22 Professional Development Programs".

23 **3. Referenced Document**

- 24 3.1. SWGDE Training Guidelines for Video Analysis, Image Analysis and Photography
25 Version: 1.1 (February 8, 2016).
- 26 3.2. ASTM (2015) Standard Terminology for Digital and Multimedia Evidence
27 Examination. ASTM E2916-13
- 28 3.3. SWGFAST Document 19. Standard Terminology of Friction Ridge Examination,
29 (2013).
- 30 3.4. ASTM (2018 draft) Standard Practice for Forensic Scientist Practitioner Training
31 Continuing Education and Professional Development Programs. ASTM WK40039

32 **4. Terminology**

33 4.1. **Video Analysis**, the scientific examination, comparison, or evaluation of video in legal
34 matters.¹

35 4.2. **Image Analysis**, the application of image science and domain expertise to examine and
36 interpret the content of an image, the image itself, or both in legal matters.²

37 4.3. **Photography**, the mix of art and science for the capture of images on a light sensitive
38 surface.³

39 4.4. **Competency**, Possessing and demonstrating the requisite knowledge, skills and abilities
40 to successfully perform a specific task.⁴

41 4.5. **Proficiency**, the ongoing demonstration of competency.⁵

42 **5. Limitations**

43 5.1. Some organizations may include additional topics of training beyond what is
44 recommended in this document. Regardless of the exact training topics selected, the
45 program should demonstrate and document that the training selected is adequate to
46 ensure competency for the specific tasks being undertaken by the trainee

47 5.2. Training topics introduced in this document may not fit the needs of individual
48 organizations, when job-specific duties are limited to a subset of those listed. Each
49 organization should determine the minimum training guidelines for examinations
50 performed.

51 5.3. Training can quickly become obsolete, and continuing education is needed to maintain
52 proficiency.

53 5.4. Additional training may be needed for new technologies and procedures that are not
54 included in this document.

55 **6. Job Categories**

56 6.1. Organizations may choose to use different titles, but the typical responsibilities are
57 defined below. Differentiation between job categories is based on the degree to which
58 personnel are involved in the collection and examination process. However, since job
59 categories frequently overlap, training programs should be specific to the tasks

¹ ASTM E2916-13, 2013.

² SWGDE Training Guidelines for Video Analysis, Image Analysis and Photography Version: 1.1

³ SWGDE Training Guidelines for Video Analysis, Image Analysis and Photography Version: 1.1

⁴ SWGFAST Document 19.

⁵ SWGFAST Document 19.

60 performed by the individual, and may contain topics related to several of the following
61 job categories.

62 6.1.1. First Responder includes personnel who are the first to secure, preserve, or
63 collect video, image, and photographic evidence at a crime scene. These
64 personnel often have general crime-scene evidence collection responsibilities.

65 6.1.2. Field Photographer/Videographer includes personnel who document and
66 preserve conditions and evidence through photography or videography,
67 primarily, but not exclusively, outside the laboratory.

68 6.1.3. Technician includes personnel whose primary responsibility is to collect or
69 prepare video, image, and photographic evidence for examination and analysis.

70 6.1.4. Laboratory Photographer includes personnel whose primary responsibility is to
71 document and preserve evidence through photography within the laboratory.

72 6.1.5. Examiner/Analyst includes personnel for whom examination, analysis, or
73 recovery of video, image, and photographic evidence is a major component of
74 their routine duties.

75 **7. Training Topics According to Job Category**

76 7.1. First Responder

77 7.1.1. Technical Foundations

78 7.1.1.1. Video formats, standards and file identification

79 7.1.1.2. Basic photography concepts

80 7.1.2. Equipment

81 7.1.2.1. Recording and playback devices

82 7.1.2.2. Monitors and other output devices

83 7.1.2.3. Media types

84 7.1.2.4. Digital camera

85 7.1.3. Techniques

86 7.1.3.1. Basic crime scene photography

87 7.1.3.2. Video data recovery

88 7.1.3.3. Evidence handling and packaging

89 7.1.4. Legal Foundations

- 90 7.1.4.1. Specific legal requirements to include admissibility issues,
91 discovery and an overview of the criminal justice system.
- 92 7.1.4.2. Courtroom testimony
- 93 7.2. Field Photographer
- 94 7.2.1. Technical Foundations
- 95 7.2.1.2. Principals of Photography, including lighting, exposure, file
96 formats and compression, and composition of images.
- 97 7.2.1.3. Procedures for recording quality images in various situations
- 98 7.2.1.4. Image handling and integrity
- 99 7.2.2. Equipment
- 100 7.2.2.1. Camera suitable for job function
- 101 7.2.2.2. Lighting sources
- 102 7.2.2.3. Ancillary equipment and accessories (tripods, removable media,
103 scales, etc.)
- 104 7.2.2.4. Software/applications
- 105 7.2.3. Techniques
- 106 7.2.3.1. Various lighting techniques to include alternate light sources (ALS)
- 107 7.2.3.2. Macro Photography
- 108 7.2.3.3. Comparative photography (ie. Latent prints, impressions
- 109 7.2.3.4. General crime scene documentation
- 110 7.2.3.5. Subject (person) photography
- 111 7.2.3.6. Specialized photography (e.g., trajectory, aerial photography,
112 panoramic photography, blood stain patterns, and techniques
113 related to other forensic disciplines)
- 114 7.2.3.7. Evidence handling and packaging
- 115 7.2.4. Legal Foundations
- 116 7.2.4.1. Topics included in 7.1.4
- 117 7.3. Laboratory Photographer
- 118 7.3.2. Technical Foundations
- 119 7.3.2.1. Topics included in 7.2.1
- 120 7.3.2.2. Microscopy

121	7.3.2.3.	Macro-photography
122	7.3.2.4.	Scanner image capture
123	7.3.3.	Equipment
124	7.3.3.1.	Topics included in 7.2.2
125	7.3.3.2.	Copy stands
126	7.3.3.3.	Microscopes
127	7.3.3.4.	Scanners
128	7.3.4.	Techniques
129	7.3.4.1.	Topics included in 7.2.3
130	7.3.4.2.	Photomicrography
131	7.3.4.3.	Other imaging technologies
132	7.3.5.	Legal Foundations
133	7.3.5.1.	Topics included in 7.1.4
134	7.4.	Video Technician
135	7.4.2.	Technical Foundations
136	7.4.2.1.	Topics included in 7.1.1
137	7.4.2.2.	Principles of analog video recording
138	7.4.2.3.	Compression artifacts
139	7.4.2.4.	Analog video security system concepts
140	7.4.2.5.	Basic audio principles
141	7.4.3.	Equipment
142	7.4.3.1.	Topics included in 7.1.2
143	7.4.3.2.	Hardware for duplication, conversion and optimization
144	7.4.3.3.	Software for duplication, conversion and processing
145	7.4.3.4.	Video signal measuring devices
146	7.4.4.	Techniques
147	7.4.4.1.	Topics included in 7.1.3
148	7.4.4.2.	Playback optimization
149	7.4.4.3.	Video processing techniques
150	7.4.4.4.	Image processing techniques
151	7.4.5.	Legal Foundations

- 152 7.4.5.1. Topics included in 7.1.4
- 153 7.5. Video Analyst
- 154 7.5.2. Technical Foundations
- 155 7.5.2.1. Topics included in 7.4.1
- 156 7.5.2.2. Broadcast theory and history
- 157 7.5.2.3. Basic digital theory
- 158 7.5.2.4. Imaging science
- 159 7.5.2.5. Frequency fundamentals
- 160 7.5.2.6. Video signal standards
- 161 7.5.2.7. Video editing
- 162 7.5.2.8. Human factors relating to forming conclusions in analysis (e.g.,
- 163 bias)
- 164 7.5.3. Equipment
- 165 7.5.3.1. Topics included in 7.4.2
- 166 7.5.3.2. Hardware for calibration and maintenance
- 167 7.5.4. Techniques
- 168 7.5.4.1. Topics included in 7.4.3
- 169 7.5.4.2. Video editing
- 170 7.5.4.3. Advanced video enhancement techniques
- 171 7.5.4.4. Advanced image enhancement techniques
- 172 7.5.4.5. Signal analysis
- 173 7.5.4.6. Video media reconstruction
- 174 7.5.4.7. Content authenticity
- 175 7.5.4.8. Source authenticity
- 176 7.5.5. Legal Foundations
- 177 7.5.5.1. Topics included in 7.1.4
- 178 7.5.5.2. Moot court exercises, including admissibility issues (e.g., Daubert
- 179 v. Merrell Dow Pharmaceuticals (1993), Frye v. United States
- 180 (1923), Federal Rules of Evidence (Rules 701-706), etc.)
- 181 7.5.5.3. Testimony monitoring
- 182 7.6. Image Technician

- 183 7.6.1. Technical Foundations
- 184 7.6.1.1. Principles of video recording
- 185 7.6.1.2. Principles of traditional and digital photography
- 186 7.6.1.3. Principles of digital media, file identification, and recovery
- 187 7.6.1.4. Image types and formats
- 188 7.6.1.5. Compression artifacts
- 189 7.6.2. Equipment
- 190 7.6.2.1. Recording and playback devices
- 191 7.6.2.2. Monitors and other output devices
- 192 7.6.2.3. Media types
- 193 7.6.2.4. Hardware for duplication, conversion and optimization
- 194 7.6.2.5. Software for duplication, conversion and processing
- 195 7.6.3. Techniques
- 196 7.6.3.1. Video processing techniques
- 197 7.6.3.2. Image processing techniques
- 198 7.6.3.3. Evidence handling and packaging
- 199 7.6.4. Legal Foundations
- 200 7.6.4.1. Those topics included in 7.1.4
- 201 7.7. Image Analyst
- 202 7.7.1. Technical and Scientific Foundations
- 203 7.7.1.1. Topics included in 7.6.1
- 204 7.7.1.2. Image science and technology
- 205 7.7.1.3. Image comparison theory
- 206 7.7.1.4. Optics
- 207 7.7.1.5. Photogrammetry theory
- 208 7.7.1.6. Data integrity and imaging artifacts
- 209 7.7.1.7. Specific domain knowledge for content analysis and comparison
- 210 7.7.1.8. Statistics
- 211 7.7.1.9. Human factors relating to forming conclusions in analysis (e.g.,
- 212 bias)
- 213 7.7.2. Equipment

- 214 7.7.2.1. Topics included in 7.6.2
- 215 7.7.2.2. Capture, input and output devices
- 216 7.7.2.3. Digital storage devices and media
- 217 7.7.2.4. Software, including
 - 218 7.7.2.4.1. File identification
 - 219 7.7.2.4.2. Diagnostics
 - 220 7.7.2.4.3. Calibration
 - 221 7.7.2.4.4. Restoration of corrupted files
 - 222 7.7.2.4.5. Analysis
 - 223 7.7.2.4.6. Metadata determination
- 224 7.7.3. Techniques
 - 225 7.7.3.1. Topics included in 7.6.3
 - 226 7.7.3.2. Photogrammetry
 - 227 7.7.3.3. Comparison
 - 228 7.7.3.4. Content authentication
 - 229 7.7.3.5. Source authentication
 - 230 7.7.3.6. Advanced video enhancement techniques
 - 231 7.7.3.7. Advanced image enhancement techniques
- 232 7.7.4. Legal Foundations
 - 233 7.7.4.1. Topics included in 7.5.4

234	8. Keywords
235	8.1. digital multimedia analysis
236	8.2. forensic video analysis
237	8.3. forensic photography
238	8.4. baseline education
239	8.5. categories of training
240	8.6. competency
241	8.7. education
242	8.8. image analysis
243	8.38. professional development
244	8.39. proficiency
245	8.40. training
246	

247 **9. History**

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Revision	Issue Date	Section	History
1.0	10/22/16		Original working draft created.
2.0	7/26/16		Second working draft created.
3.0	4/3/17		Third working draft created.
4.0	4/20/17		Fourth working draft created
5	4/20/17		Fifth working draft created
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249