



Scientific Working Group on Digital Evidence

Photographic Equipment and Infrastructure Recommendations

16-P-001-2.0

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1. Introduction

The purpose of this document is to provide guidance and recommendations for equipment, infrastructure, training, Standard Operating Procedure (SOP) development, and the security and integrity issues for photography in the forensic environment.

This document addresses the photographic documentation of events and/or subjects that are in the field, forensic laboratory, studio, or other controlled environment.

2. General Equipment Considerations

Equipment needs depend on the tasks performed and the intended use of the image. Evaluation of all equipment used to capture imagery should occur prior to use to ensure the equipment meets the need of the task performed and the intended end use of the image.

Agencies should identify specific camera requirements such as lenses, resolution, color fidelity, exposure capability, dynamic range, durability, file formats, and storage. For example, crime scene technicians should use a camera that is capable of manual settings and has interchangeable lenses, off-camera flash, and a tripod mount. A good quality point-and-shoot camera or an electronic device with good quality integrated camera capabilities may be sufficient for first responders.

The agency should have a specific mechanism for determining whether a piece of hardware meets requirements. Some applications, such as impression evidence, have specific quantitative and qualitative requirements regarding equipment or resolution (see SWGDE documents “Guidelines for Capturing Latent Impressions Using a Digital Camera in the Field”, “Guidelines for the Digital Imaging of Footwear and Tire Impressions”). Specification sheets may be used as a guide, but in most cases, it will be necessary to test the equipment under operational conditions.

Equipment acquisition and SOPs should ensure that field personnel are provided with adequate consumables (i.e. batteries, removable storage media) and accessories (i.e. flash, tripods). In addition, adequate physical storage and protection of equipment and media is necessary to maintain operations.

3. Infrastructure

Infrastructure refers to both hardware and software necessary to store, secure, process, transmit and output data. Creating and maintaining a sound infrastructure requires developing a needs assessment, validating, verifying, maintaining, and upgrading the systems. Inadequate infrastructure will undermine the ability to secure and efficiently utilize the images.

3.1 Needs Assessment

An agency should perform a needs assessment to determine what infrastructure is necessary for its specific tasks and demonstrate how it plans to fulfill those obligations. This assessment identifies what tasks are to be performed, under what circumstances those tasks will be



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performed, and the end use of the imagery. Specific hardware, software, and training requirements can be targeted to tasks, circumstances, and end uses.

An important aspect to consider is image output. Output of images refers to display devices, printers, optical media and/or electronic file share programs. The end use of an image determines the appropriate output method. For example, the hardware requirements will differ significantly between images that are to be analyzed on an 8 x 10" print versus those that will be viewed with a projector or monitor.

3.2 Validation and Verification

Validation is a necessary part of infrastructure design and usage. The degree and type of validation should be reasonably targeted to the context within which the assets will be used; it is not necessary to validate functions or capabilities that will not be used. Verification that assets are functioning appropriately (sometimes called quality-control tests) should be an integral part of any SOP and must be conducted before the asset is put into use. If the asset has been repaired or taken out of service, verification that it is functioning appropriately must be conducted before use. The frequency and degree of verification may be application and agency specific.

3.3 Maintenance

Agencies should plan for and adopt strategies and responsibilities for preventive maintenance, repair, and inspection of hardware and software to maintain optimum performance and to prevent catastrophic failure.

3.4 Lifecycle

Infrastructure assets, particularly in a high-technology area such as imaging, are subject to wear, tear, and obsolescence. Equipment used will be subject to physical stress and will eventually require repair or replacement. Other assets, such as rechargeable batteries, have a finite lifespan. Technology advances quickly and newer, less expensive hardware/software may provide better results at a lower operational cost. New technologies may allow expansion of service opportunities or provide capabilities that were previously not available. Agencies should periodically assess their needs and determine if new technologies or upgrades are warranted.

4. Training

A training program is essential for successful image acquisition, processing, and output of images. Training programs should be designed and implemented to provide the skills and knowledge required to successfully perform at an appropriate level of responsibility. See SWGDE document "SWGDE Training Guidelines for Video Analysis, Image Analysis and Photography."

5. SOP Development

SOPs are agency-specific and are important to provide structure, guidance, and to ensure consistency. See the SWGDE document "SWGDE Model SOP for Computer Forensics," as an example.

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6. Integrity and Security of Images

Integrity ensures that the original image is available in its unaltered form. Security is imperative to maintain integrity, which includes protection of portable data storage devices, computer facilities, and data stored and/or transmitted on computer systems. It involves the use of management and personnel, as well as operational and technical controls. Refer to SWGDE Document “Best Practices for Maintaining the Integrity of Digital Images and Digital Video.”

7. Categories of Photography

Photography generally falls into two different categories depending on the extent of documentation required. Each type will require different levels of training, knowledge, experience, and equipment.

In addition to general or advanced photographic knowledge, there are specialized applications that require additional training based upon specific needs, such as aerial, surveillance, arson, or hazardous materials (HAZMAT) photography.

7.1 General Photography

- Requires basic knowledge of camera operation and photographic composition
- May allow automated camera settings
- Utilized for documentation purposes. [1]
- Images may be captured using a file format with minimal compression (i.e. jpeg)

7.1.1 Equipment for General Photography

A camera with flash, close-up capability, and sufficient resolution for the intended use.

7.1.2 Examples of General Photography

First responders are frequently called upon to document conditions they find at an incident where a crime scene photography unit or specialist may not be requested or available. Examples may include: domestic violence incidents, traffic accidents, minor property crimes, and other incidents as defined by agency-specific policies. Photography may not be the first responder's primary responsibility and they may not have general photography training. The first responder must be cognizant that the images captured may contain important information that was not recognized at the time the photograph was taken. Unless first responders are trained in advanced photography techniques and have the equipment necessary for comparison and analysis, it is advised that they do not photograph these types of evidence. Agencies should designate the circumstances in which first responders should photograph and the circumstances that should prompt a request for individuals with advanced photographic training.

7.2 Advanced Photography

- Requires knowledge of manual exposure control, flash photography and other lighting controls, alternative light sources, use of tripods and remote shutter releases, filters, and other accessories

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- Requires the use of a Digital Single Lens Reflex (DSLR) camera or Mirrorless Interchangeable - Lens Camera (MILC) with manual settings, interchangeable lenses, and off-camera flash capabilities
- Images intended for scientific analysis [1] should be captured using a file format with lossless or no compression (ie. RAW or TIFF) and the highest resolution available on the recording device. [2]

7.2.1 Equipment for Advanced Photography

- A DSLR or MILC camera that is capable of manual settings, with interchangeable lenses, off camera flash, remote shutter release, and a tripod mount
- The camera settings should allow for the sufficient resolution for the intended use.
- Cameras should be set to either uncompressed or lowest compression (highest quality format)
- Other standard equipment may include:
 - External battery packs
 - Tripod
 - Additional removable media
 - 18% Gray card and/or color checker
 - Various types of known scales
 - Various types of filters
 - External flashes and cords
 - Remote shutter release
 - Various types of lenses (macro, normal, zoom)

7.2.2 Example of Advanced Photography

Advanced photography includes crime scene photography performed by a dedicated or specialized unit. The goal of crime scene photography is documenting evidence and other details of a crime scene in a true and accurate manner. Including, but not limited to, accurately representing details and colors; capturing overall, intermediate, close-up, and examination images with accurate spatial relationships; comparison images; and contending with varying lighting and physical conditions.

Other examples of advanced photography include but are not limited to documentation of friction ridge details, impressions, blood spatter, etc. Where specialized training and equipment may be required.



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8. References

- [1] SWGDE document “Image Categories in Forensic Science” [Online]
<https://www.swgde.org/documents/published-by-committee/photography>
- [2] SWGDE document “Digital Image Compression and File Formats Guidelines” [Online]
<https://www.swgde.org/documents/published-by-committee/photography>

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History

Revision	Issue Date	History
1.0 DRAFT	9/15/2016	Initial draft created and SWGDE voted to release as a Draft for Public Comment.
1.0 DRAFT	10/8/2016	Formatted and technical edit performed for release as a Draft for Public Comment
1.0	1/12/2017	Sentence added to expand on verification requirements if a device has been repaired. SWGDE voted to publish as an Approved document (Version 1.0).
1.0	2/21/2017	Formatted and published as Approved Version 1.0
2.0 DRAFT	1/10/2023	Five-year document review with updates. Submitted to SWGDE for vote to release as a Draft for Public Comment.
2.0 DRAFT	3/31/2023	SWGDE voted to release as a Draft for Public Comment; formatted for release for public comment.

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