SWGDE and SWGIT Glossary of Terms

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Preface

SWGDE and SWGIT provide this Glossary of Terms with general, as well as discipline specific, definitions as they apply across the spectrum of image analysis, computer forensics, video analysis, and forensic audio. Sources are notated within brackets at the end of the definition when that definition came from outside of SWGDE and SWGIT. The following abbreviations will be used throughout this glossary and appear before the definition as applicable:

(i) – Image Analysis
(c) – Computer Forensics
(v) – Video Analysis
(a) – Forensic Audio

Administrative Review

A procedure used to check casework for consistency with agency/laboratory policy and for editorial practice.

Algorithm

A step-by-step procedure for solving a problem or accomplishing some end. [*Webster's Dictionary*]

Archive Copy

A copy of data placed on media suitable for long-term storage, from which subsequent working copies can be produced.

Archive Image

(i, v) Any image placed on media that is suitable for long-term storage.

(c) A bit stream duplicate of the original data placed on media that is suitable for long-term storage.

Archiving

The process of storing data in a manner suitable for long term availability and retrieval.

Artifact

(a, i, v) A visual/aural aberration in an image, video, or audio recording resulting from a technical or operational limitation. Examples include speckles in a scanned picture or "blocking" in images compressed using the JPEG standard.

(c) Information or data created as a result of the use of an electronic device that shows past activity.

Audio Enhancement

Processing of recordings for the purpose of increased intelligibility, attenuation of noise, improvement of understanding the recorded material and/or improvement of quality or ease of hearing.

Authentication

The process of substantiating that the data is an accurate representation of what it purports to be.

Capture

The process of recording data, such as an image, video sequence, or audio stream.

Capture card/frame grabber

A piece of computer hardware that accepts an analog or digital signal and outputs the signal as digital data.

Capture Device

A device used in the recording of data.

Carve

(c) The extraction of a portion of data for the purpose of analysis.

CD/DVD (compact disc/digital versatile disc)

Optical disc formats designed to function as digital storage media.

Chain of Custody

The chronological documentation of the movement, location and possession of evidence.

Cognitive Image Analysis

(i, v) The process used to extract visual information from an image.

Colorimetry

The quantification of the color of an object.

Color Range

The range of colors that can be detected by a sensor.

Compression

The process of reducing the size of a data file. (See also, "Lossy Compression" and "Lossless Compression".)

Compression ratio

The size of a data file before compression divided by the file size after compression.

Computer Forensics

A sub-discipline of Digital & Multimedia Evidence, which involves the scientific examination, analysis, and/or evaluation of digital evidence in legal matters.

Copy
An accurate reproduction of information.

Data
Information in analog or digital form that can be transmitted or processed.

Data Analysis
The assessment of the information contained within the media.

Data Extraction
A process that identifies and recovers information that may not be immediately apparent.

Deinterlacing
(v) Separating an interlaced frame into two discrete fields.

Digital Evidence
Information of probative value that is stored or transmitted in binary form.

Digital Image
(i) An image that is represented by discrete numerical values organized in a two-dimensional array. [Taken from the "*Encyclopedia of Photography*" 3rd Edition] When viewed on a monitor or paper, it appears like a photograph.

(c) A bit stream duplicate of the original data.

Directory Listing
(c) A list of files contained within an object. It may also contain other information such as the size and dates of the files.

Duplicate
An accurate and complete reproduction of all data objects independent of the physical media.

Dynamic Range
(i) The difference between the brightest highlight and darkest value that a sensor (e.g. film or CCD) can detect and record in a single image.

(a, v) The ratio of the strongest (undistorted) signal to that of the weakest (discernible) signal in a unit or system as expressed in decibels (dB). A way of stating the maximum signal to noise ratio.

Erased File Recovery
(c) The process for recovering deleted files.

Field
(v) An element of a video signal containing alternate horizontal lines. For interlaced video, the scanning pattern is divided into two sets of spaced lines (odd and even) that are displayed sequentially. Each set of lines is called a field, and the interlaced set of the two sets of lines is a frame.

File Format
The structure by which data is organized in a file.

File Slack
(c) The data between the logical end of a file and the end of the last storage unit for that file.
Ex: For the FAT file system, the data between the logical end of the file and the end of the cluster.

Forensic
The use or application of scientific knowledge to a point of law, especially as it applies to the investigation of crime.

Forensic Audio
A subdiscipline of Digital & Multimedia Evidence, which involves the scientific examination, analysis, comparison, and/or evaluation of audio.

Format
(v) One or several combined elements that may be used to describe the video recording method. These include tape width (e.g. 8mm, ½ inch, ¾ inch, 1 inch), signal form (e.g. composite, Y/C, component), media (e.g. VHS tape, DVD, CD), data storage type (e.g. analog/digital, AVI/MPEG), and signal standard (e.g. NTSC, PAL, SECAM).

Frame
(v) Lines of spatial information of a video signal. For interlaced video, a frame consists of two fields, one of odd lines and one of even lines, displayed in sequence. For progressive scan (non-interlaced) video, the frame is written through successive lines that start at the top left of the picture and finish at the bottom right.

Free Space
Data storage areas available for use by the computer. The area may already contain previously stored information. Also referred to as Unallocated Space.

Format Conversion
(a, i, v) To transfer audio and/or video information from one media type to another and/or from one recording method to another.

Hash or Hash Value
Numerical values, generated by hashing functions, used to substantiate the integrity of digital evidence and/or for inclusion /exclusion comparisons against known value sets.

Hashing Function
An established mathematical calculation that generates a numerical value based on input data. This numerical value is referred to as the hash or hash value.

Image
(c) A bit stream duplicate of the original data.

(i, v) An imitation or representation of a person or thing, drawn, painted, photographed, etc.

Image Analysis
A sub-discipline of Digital & Multimedia Evidence, which involves the application of image science and domain expertise to examine and interpret the content of an image and/or the image itself in legal matters.

Image Averaging
(i, v) The process of averaging similar images, such as sequential video frames, to reduce noise in stationary scenes.

Image Comparison (Photographic Comparison)
(i) The process of comparing images of questioned objects or persons to known objects or persons or images thereof, and making an assessment of the correspondence between features in these images for rendering an opinion regarding identification or elimination.

Image Enhancement
(i, v) Any process intended to improve the visual appearance of an image or specific features within an image.

Image Output
(i)   The means by which an image is presented for examination or observation.

Image Processing
(i) Any activity that transforms an input image into an output image.

Image Processing Log
(i) A record of the steps used in the processing of an image.

Image Synthesis
(i, v) Any process that renders an image, using computer graphics techniques, for illustrative purposes (i.e. age progression, facial reconstruction, accident/crime scene reconstruction).

Imaging Technology
(i, v) Any system or method used to capture, store, process, analyze, transmit, or produce an image. Such systems include film, electronic sensors, cameras, video devices, scanners, printers, computers, etc.

Image Transmission
(i, v) The act of moving images from one location to another.

Integrity verification
The process of confirming that the data presented is complete and unaltered since time of acquisition.

Intermediate Storage
Any media or device on which data is temporarily stored for transfer to permanent or archival storage.

Interlaced Scan
(v) A technique of combining two television fields in order to produce a full frame. The two fields are composed of only odd and only even lines, which are displayed one after the other but with the physical position of all the lines interleaving each other, hence interlace. (*CCTV*, Vlado Damjanovski, Butterworth-Heinemann. 2000)

Interpolation
(i, v) A method of image processing whereby one pixel, block, or frame is displayed or stored based on the differences between the previous and subsequent pixel, block, or frame of information. [Taken from the *Encyclopedia of*

Photography 3rd Edition] This is often done to increase the apparent clarity of an image.

Log File
A record of actions, events, and related data.

Logical Copy
(c) An accurate reproduction of information contained within a logical volume (e.g. mounted volume, logical drive assignment, etc).

Lossy Compression
Compression in which data is lost and cannot be retrieved in its original form.

Lossless Compression
Compression in which no data is lost and all data can be retrieved in its original form.

Media
Objects on which data can be stored.

Media Characterization
The process of inspecting, identifying, and noting the properties of the media.

Metadata
Data, frequently embedded within a file, that describes a file or directory, which can include the locations where the content is stored, dates and times, application specific information, and permissions.

Multiplexer/Demultiplexer
(v) A device used to combine multiple video signals into a single signal or separate a combined signal. These devices are frequently used in security and law enforcement applications for recording and/or displaying multiple camera images simultaneously or in succession.

Multimedia Evidence
Analog or digital media, including, but not limited to, film, tape, magnetic and optical media, and/or the information contained therein.

Native File Format

The original form of a file. A file created with one application can often be read by others, but a file's native format remains the format it was given by the application that created it. In most cases the specific attributes of a file (for example, fonts in a document) can only be changed when it is opened with the program that created it. [*Newton's Telecom Dictionary*]

NTSC

National Television Standards Committee.

Original Image

(i) An accurate and complete replica of the primary image, irrespective of media. For film and analog video, the primary image is the original image.

PAL

Phase Alternation Line. [European Broadcast Union]

Partition

User defined section of electronic media.

Password Recovery

The process of locating and identifying a series of characters used to restrict access to data.

Photogrammetry

The art, science, and technology of obtaining reliable information about physical objects and the environment through the processes of recording, measuring, and interpreting photographic images and patterns of electromagnetic radiant energy and other phenomena [*The Manual of Photogrammetry*, 4th Edition, 1980, ASPRS]. In forensic applications, Photogrammetry, sometimes called "*mensuration*," most commonly is used to extract dimensional information from images, such as the height of subjects depicted in surveillance images and accident scene reconstruction. Other forensic photogrammetric applications include visibility and spectral analyses.

Photogrammetric Analysis

The process of obtaining dimensional information regarding objects and people depicted in an image.

Photometry

The measurement of light values of objects in an image.

Physical Copy
(c) An accurate reproduction of information contained on the physical device.

Physical Image
(c) A bitstream duplicate of data contained on a physical device.

Playback Optimization
(a, v) The process of determining the most suitable equipment and settings for analyzing the output signal.

Playback
Recorded material viewed and heard as recorded, facilitated by camcorder, cassette recorder, or other device.

Primary Image
(i, v) Refers to the first instance in which an image is recorded onto any media that is a separate, identifiable object. Examples include a digital image recorded on a flash card or a digital image downloaded from the Internet.

Processed Image
(i, v) Any image that has undergone enhancement, restoration or other operation.

Production Switcher
(a, v) A device and/or software used to mix video and/or audio signals from two or more sources (e.g. cameras, videocassette recorder/players, character generators) for dissolves, wipes, and other transition effects.

Proficiency Test

A test to evaluate analysts, technical support personnel, and the quality performance of an agency. (*Four examples are provided*)

    1. **Open test** - the analyst(s) and technical support personnel are aware they are being tested.

    2. **Blind test -** the analyst(s) and technical support personnel are not aware they are being tested.

    3. **Internal test** - conducted by the agency itself.

    4. **External test** - conducted by an agency independent of the agency being tested.

Progressive Scan

(v) Display scan pattern where each line of the frame is scanned out sequentially.

Proprietary File Format

Any file format that is unique to a specific manufacturer or product.

Quality Assurance

Planned and systematic actions necessary to provide sufficient confidence that an agency's/laboratory's product or service will satisfy given requirements for quality.

Quantitative Image Analysis

(i, v) The process used to extract measurable data from an image.

Reconstruction

The process of repairing damaged media in order to allow the retrieval of data.

Reference Materials

Refers to items such as published literature, hardware and software documentation, hash sets, header sets, etc.

Reliability

The extent to which information can be depended upon.

Reproducibility
The extent to which a process yields the same results on repeated trials.

Residue
(c) Data that is contained in unallocated space or file slack.

(a) The residue of a filtered signal is the algebraic difference between the filter output and its signal input. [*Diamond Cut Users Manual*]

Resolution
(i, v) The act, process, or capability of distinguishing between two separate but adjacent parts or stimuli, such as elements of detail in an image, or similar colors. [Taken from the *Encyclopedia of Photography,* 3rd Edition]

Restoration
(i) The process of reversing damage done to an image due to a known cause (such as defocus or motion blur) so that the effects of the damage can be removed or reduced.

(c) The process of restoring data from an image.

Routing Switcher
(a, v) A device and/or software used to direct the path of one or more signals into one or more devices.

Standard Conversion
(v) The transformation of one television system signal to another. For example, NTSC to PAL.

Source Code
The list of instructions written in a programming language used to construct a computer program.

Storage Media
Any object on which data is preserved.

Technical/Peer Review
An evaluation conducted by a second qualified individual of reports, notes, data, conclusions, and other documents.

Time-base Corrector (TBC)

(v) An electronic device used to correct timing inconsistencies and stabilize the playback of the video signal for optimum quality. It also synchronizes video sources allowing image mixing.

Time Lapse Video Recording

(v) Process by which images are recorded at less than the standard rate of frames per second (NTSC – 29.97; PAL – 25.00) thus extending the period of time that can be covered by the storage medium.

Timeline/Sequence Reconstruction

The process of relating images, audio, or other data to one another in a chronologically ordered succession.

Traditional Enhancement Techniques

(i) Techniques that have direct counterparts in traditional darkrooms. They include brightness & contrast adjustment, color balancing, cropping, and dodging & burning.

Unallocated Space

(c) Data storage areas available for use by the computer. The area may already contain previously stored information. Also referred to as *Free Space*.

Validation

The process of performing a set of experiments, which establishes the efficacy and reliability of a tool, technique or procedure or modification thereof.

Validation Testing

An evaluation to determine if a tool, technique or procedure functions correctly and as intended.

Vectorscope

(v) An electronic device that measures a video signal's chrominance (color) performance.

Verification

1. The process of confirming the accuracy of an item to its original.
2. Confirmation that a tool, technique or procedure performs as expected.

Video
The electronic representation of a sequence of images, depicting either stationary or moving scenes. It may include audio.

Video Analysis
A subdiscipline of Digital & Multimedia Evidence, which involves the scientific examination, comparison, and/or evaluation of video in legal matters.

Video Distribution Amplifier
(v) A device used to divide single video signals, while boosting their strength for delivery to multiple video devices.

Video Enhancement
Any process intended to improve the visual appearance of video sequences or specific features within video sequences.

Waveform Monitor
(v) An electronic device that provides a graphic display of a video signal.

Work Copy
A copy or duplicate of a recording or data that can be used for subsequent processing and/or analysis.

Write Block/Write Protect
Hardware and/or software methods of preventing modification of media content.