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1.2 SWGFAST Definitions

1.2.1 Glossary – Anatomy

- **BALL AREA**
The large cushion area below the base of the big toe.
- **BRACHYDACTYLY**
Abnormal shortness of fingers or toes.
- **BULB OF FINGERS (THUMBS, TOES)**
The portion of the friction skin on the tips of fingers, thumbs, or toes in the distal phalanx, from one side of the nail to the opposite side of the nail.
- **CALCAR AREA**
Area located at the heel of the foot.
- **CARPAL DELTA AREA**
Area of the palm containing a delta formation nearest the wrist.
- **CREASE**
A line or linear depression; grooves at the joints of the phalanges, at the junction of the digits and across the palmar and plantar surfaces that accommodate flexion.
- **DERMABRASION**
A technique using chemicals, wire brush, surgery or lasers which can cause either temporary or permanent loss of ridge detail.
- **DERMAL PAPILLAE**
Peg-like formations on the surface of the dermis.
- **DERMIS**
The layer of skin beneath the epidermis.
- **DIGIT**
A toe or finger.
- **DISSOCIATED RIDGES**
Disrupted, rather than continuous, ridges; an area of ridge units that did not form into friction ridges.
- **DISTAL**
Farthest away from the center or point of attachment. The direction away from the body.
- **DUCT**
A tube or canal that delivers secretions or excretions.
- **DYSPLASIA**
Ridge units that did not form complete friction ridges due to a genetic cause.



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- **ECCRINE GLANDS**
Sweat glands that open on all surfaces of the skin.
- **ECTRODACTYLY**
Congenital absence of all or part of a digit(s).
- **EPIDERMIS**
The outer layer of the skin.
- **FETUS**
For the human species, the unborn individual from about the end of the second month of development until birth. Earlier stages are termed embryo.
- **FIBULA**
The smaller of the two bones in the lower leg on the little toe side.
- **FIBULAR AREA**
The plantar area situated on the little toe side of the foot.
- **FINGER**
See Phalange.
- **FRICTION RIDGE**
A raised portion of the epidermis on the palmar or plantar skin.
- **FULCRUM AREA**
The area between the thumb and index finger on the palm.
- **HALLUCAL**
A region which corresponds to the distal thenar and first interdigital region of the palm.
- **HYPERDACTYLY**
See Polydactyly.
- **HYPOTHENAR AREA**
The friction ridge skin on the palm, below the interdigital area on the ulnar side of the palm.
- **INTERDIGITAL**
Palmar area below the fingers and above the thenar and hypothenar areas.
- **MACRODACTYLY**
Abnormal largeness of fingers or toes.
- **MEDIAL**
At or near the center.
- **MOTTLED SKIN**
Ridge detail is present, but is dissociated due to trauma or genetic causes. It lacks any continuous pattern of flow.
- **MACRODACTYLY**
Congenitally abnormal largeness of fingers or toes.



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- **ORTHODACTYLY**
Fingers and toes cannot be flexed.
- **PALM (PALMAR AREA)**
The friction ridge skin area on the side and underside of the hand.
- **PALMAR ZONE**
The interdigital area of the palm.
- **PAPILLAE**
Peg-like structures of the dermis.
- **PAPILLARY RIDGES**
Orderly rows of eccrine glands positioned along the path of the friction ridge.
- **PATHOLOGY**
The study of causes, nature, and effects of diseases, trauma, and other abnormalities.
- **PATTERN FORMATIONS**
Friction ridge skin arrangements formed as early as the third month of gestation.
- **PENTADACTYLY**
The occurrence of five fingers or toes on a hand or foot.
- **PHALANGE (PHALANX)**
A finger or toe, with proximal, medial and distal segments. Any bones in the fingers or toes.
- **PLANTAR AREA**
The friction ridge skin area on the side and underside of the foot.
- **POLYDACTYLY**
A hand or foot having more than the normal number of fingers or toes.
- **PORES**
Small openings on friction ridges through which body fluids are released.
- **PROXIMAL**
Situated at the closest point of attachment; direction toward the body.
- **RADIAL**
The smaller of the two bones of the forearm, on the same side as the thumb.
- **RIDGE (FRICTION)**
See Friction Ridge.
- **RIDGE APLASIA**
Congenital absence of friction ridge skin.
- **RIDGE DISSOCIATION**
See Dissociated Ridges
- **RIDGE DYSPLASIA**
See Dysplasia
- **RIDGE HYPOPLASIA**
Underdeveloped ridges associated with an excess of creases.



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- **RUDIMENTARY RIDGE**
See Secondary Ridge
- **SCAR**
A mark remaining after the healing of a wound.
- **SCARF SKIN**
Dry or dead skin which has scaled and peeled away from the surface skin.
- **SEBACEOUS GLAND**
An oil-secreting gland generally associated with a hair follicle.
- **SKIN**
The outer covering of the body consisting of the dermis and epidermis.
- **SPLIT THUMB**
Thumb that has conjoined distal phalanges.
- **SYNDACTYLY**
Refers to webbed fingers. Side-to-side fusion of digits.
- **SYMPHALANGY**
End to end fusion of the phalanges of the fingers or toes.
- **THENAR AREA**
The large cushion of the palm located at the base of the thumb.
- **TIBIA**
A bone in the lower leg.
- **TIBIAL AREA**
The plantar area situated on the big toe side of the foot.
- **TRAUMA**
Injury or damage.
- **ULNA**
The larger of the two bones of the forearm, on the palmar side of the little finger.
- **VOLAR**
Related to the palmar and plantar surfaces.
- **VOLAR PADS**
Palmar and plantar fetal tissue growth that affects friction ridge skin development and patterns.
- **VOLAR SKIN**
See Friction Skin.
- **WEBBED FINGERS**
Two or more fingers connected along the sides by skin.

1.2.2 Glossary - Friction Ridge Automation



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ADIPS

Analog Digital Image-Processing System.

AFIS

Automated Fingerprint Identification System.

ALGORITHM

Mathematical routine used in computer processing, e.g., an AFIS matching algorithm establishes the correlation of Level 2 detail between fingerprints.

ALPS

Automated Latent Print System. The latent print specific operations of an AFIS.

ALS

1. Automated Latent System. The latent print specific operations of an AFIS.
2. Alternate Light Source. Any light source, other than a laser, used to excite luminescence of latent prints, body fluids, etc., at crime scenes or on items of evidence. Now commonly referred to as a forensic light source, which includes lasers.

ANALOG

Image representation by waveform variations, e.g., video tape recordings or silver halide photographs of fingerprints.

ANSI

American National Standards Institute

APIS

Automated Palm Print Identification System. Computerized system for storage, searching and retrieval of known and latent palm print records based on friction ridge detail.

ARTIFACT

1. Any information not present in the original object/image, inadvertently introduced by image capture, processing, compressions, transmission, display or printing.
2. Any distortion or alteration not in the original friction ridge impression.

ASCII

American Standard Code for Information Interchange. A coding system that converts font characters to standard numeric values.

AUTHENTICATION

1. Process used to determine whether a digital image has been altered in any way since its capture.
2. Process used to determine whether an electric file has the correct association, i.e. name, unique identifier, friction ridge images and criminal history record.

BANDWIDTH

The total amount of data that can be transmitted per second, e.g., bandwidth may limit simultaneous high-speed transmission of digital images by multiple users in an AFIS network.

BAUD RATE

Used interchangeably with bits per second (bps), the unit of measure used to rate the speed at which data can be transmitted via computer modem.

BINARY IMAGE

An image type using only two radiometric values, e.g., black and white.



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BIOMETRIC FINGERPRINTING

Digital image capture of friction ridges and/or a template from friction ridges.

BMP

Bitmap. A non-compressed image file format. The ".bmp" suffix is used for bitmap file names.

CARD-SCAN

Electronic recording of friction ridge impressions (fingers and/or palms) from fingerprint cards, palm print cards, etc. Sometimes referred to as dead-scan or flat-bed scanner.

CCD

Charged-Coupled Device. An electronic chip capture device used in optical recording instruments which converts light energy into electrical current, e.g., the chip in a digital camera or scanner for capturing friction ridge impressions.

CJIS

Criminal Justice Information Services

CMOS

- 1. Complementary Metal Oxide Semiconductor. A digital image capture device.
- 2. A computer operating system.

COMPRESSION

The process of reducing the size of a data file.

COMPRESSION RATE

The ratio of the original file size compared to the compressed file size, e.g., 10 to 1.

COMPRESSION, LOSSLESS

Compression in which no image data is lost and the image can be restored to its original form.

COMPRESSION, LOSSY

Compression in which image data is lost and the image cannot be restored to its original form.

CONTOUR SYNTHESIZATION

See Edge Enhancement

DEF

Direct Electronic Fingerprinting

DIGITAL

Information or data that exists as numerical values.

DIGITAL CAMERA

A camera that records an image electronically as numerical values.

DIGITAL IMAGE PROCESSING

Image display and operations based on numerical pixel values and the application of computer algorithms.

DIRS

Digital Image Retrieval System. Normally an AFIS subsystem, also commonly referred to as IRS.

DOWN SAMPLING

The process of representing an image with a smaller number of samples, also referred to as sub-sampling.



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DPI

Dots Per Inch. The printing resolution of an output device. Often referred to incorrectly as PPI (pixels per inch).

EFTS

Electronic Fingerprint Transmission Specifications. Documents prescribing content and format for electronic transactions.

ENCODING

AFIS process used to record minutiae data.

FFT

Fast Fourier Transform. An algorithm used in digital image processing.

FLS

Forensic Light Source. See ALS.

GRAY SCALE IMAGE

An image type using more than two radiometric values, i.e., 256 shades of gray in an eight bit image.

IAFIS

Integrated Automated Fingerprint Identification System. The FBI's national AFIS.

INTERPOLATION

A sampling technique used to increase the size of an image file by creating more pixels and increasing the apparent resolution of an image. When used to decrease image size, interpolation is generally referred to as down sampling.

IRS

Image Retrieval System. Normally an AFIS subsystem also commonly referred to as DIRS.

JPEG

Joint Photographic Experts Group. A compressed image file format. The ".jpg" file name extension used for JPEG file names. Most JPEG images use lossy compression.

LT/TP - LATENT /TEN PRINT

AFIS

latent print to ten print search process. Sometimes referred to as LI (Latent Inquiry).

LIVE-SCAN

Electronic recording of friction ridges (fingers and/or palms).

LOSSLESS

See Compression, Lossless

LOSSY

See Compressions, Lossy

NIST

National Institute of Standards and Technology, U.S. Department of Commerce.

PIXEL

Short for picture element. The fundamental element of a digital image.



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PPI

Pixels Per Inch. The spatial resolution of a digital image. Often referred to incorrectly as DPI (dots per inch).

RADIOMETRIC RESOLUTION

The number of intensity levels (such as the number of shades of gray or color values) in a digital image.

RUVIS

Reflected Ultra-Violet Imaging System. A system based on the detection and amplification of short-wave UV light (not luminescence) from latent prints.

SCANNER

A capture device used to create digital image files from original objects, photographs, etc.

SPATIAL DENSITY

A measure of the number of pixels in a digital image, e.g., pixels per inch.

SPATIAL RESOLUTION

The relationship of the individual pixels to the size of the actual area represented. This is similar to the relationship of film grain to individual details in a photograph.

SPECTRAL RESOLUTION

The color bands of light detected during image acquisition, e.g., detection from 520 to 700 nanometers.

TEMPLATE

Format of the extracted digital friction ridge detail.

TIFF

Tagged Image File Format. An image file format. The ".tif" extension used for TIFF files. TIFF images can be lossless or lossy.

TWAIN

Technology Without An Important Name. An image acquisition and output protocol commonly used between computers and image capture devices, printers, etc.

WSQ

Wavelet Scalar Quantization. A compression algorithm used to reduce finger or palm print image file size. WSQ uses lossy compression.

Note: See also the imaging definitions in the SWGIT Glossary

1.2.3 Glossary – Classification

APPENDAGE

An attachment or connection within friction ridges.

ARCH - PLAIN

A fingerprint pattern in which the ridges enter on one side of the impression, and flow, or tend to flow, out the other with a rise or wave in the center.



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ARCH - TENTED

A type of fingerprint pattern that possesses either an angle, an up-thrust, or two of the three basic characteristics of the loop.

ALIAS (AKA)

1. A false name. 2. Another name an individual has used. (Also Known As)

BRIDGE

A connecting friction ridge between and at generally right angles to parallel running ridges.

CLASSIFICATION

Alpha/numeric formula of finger and palm print patterns used as a guide for filing and searching.

CORE

The approximate center of a pattern.

DELTA

That point on a ridge at or nearest to the point of divergence of two type lines, and located at or directly in front of the point of divergence.

DIVERGENCE

The separation of two friction ridges that have been running parallel or nearly parallel.

FINAL

A numerical value that is derived from the ridge count of a little finger, usually the right.

FOCAL POINTS

Those areas that are enclosed within the pattern area of loops and whorls. They are also known as the core and the delta.

HENRY CLASSIFICATION

A system of fingerprint classification named for Sir Edward Richard Henry (1850 - 1931).

INKED PRINT (FINGER, PALM, FOOT)

A recording of the friction ridges with black ink on a suitable contrasting background.

INNER TERMINUS

See Core.

KEY

A numerical value derived from the ridge count of the first loop beginning with the right thumb exclusive of the little fingers.

LOOP - ULNAR

A type of pattern in which one or more ridges enter upon either side, re-curve, touch or pass an imaginary line between delta and core and pass out, or tend to pass out, on the same side the ridges entered. The flow of the pattern runs in the direction of the ulna bone of the forearm (toward the little finger).

LOOP - RADIAL

A type of pattern in which one or more ridges enter upon either side, re-curve, touch or pass an imaginary line between delta and core and pass out, or tend to pass out, on the same side the ridges entered. The flow of the pattern runs in the direction of the radius bone of the forearm (toward the thumb).



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MAJOR

A value derived from the pattern types of the thumbs.

NCIC

National Crime Information Center

NCIC CLASSIFICATION

An alpha/numeric system of fingerprint classification.

OUTER TERMINUS

See Delta.

PATTERNS

The designation of friction ridge skin into basic categories of general shapes.

PATTERN AREA (CLASSIFICATION)

In the distal phalange of the fingers, the configuration of friction ridges that are utilized in classification.

PRIMARY

A numerical formula derived from the presence of any whorl pattern as they appear on the fingers.

RIDGE FLOW

The direction of a series of adjacent friction ridges. See Level 1 Detail.

RIDGE PATH

The course of a single friction ridge. See Level 2 Detail.

SECONDARY

An alpha expression derived from the pattern type of the index fingers.

SUB-SECONDARY

An alpha expression derived from the index, middle and ring fingers of both hands.

SUFFICIENT RECURVE

The space between the shoulders of a loop, free of any appendages that abut upon the re-curve at a right angle on the outside.

TYPE LINES

The two innermost ridges associated with a delta that are parallel, diverge, and surround or tend to surround the pattern area.

WHORL - ACCIDENTAL

A fingerprint pattern consisting of two different types of patterns, with the exception of the plain arch, with two or more deltas; or a pattern which possesses some of the requirements for two or more different types; or a pattern which conforms to none of the definitions.

WHORL - CENTRAL POCKET LOOP

A type of fingerprint pattern which has two deltas and at least one ridge which makes, or tends to make, one complete circuit, which may be spiral, oval, circular, or any variant of a circle. An imaginary line drawn between the two deltas must not touch or cross any recurving ridges within the inner pattern area.

WHORL - DOUBLE LOOP

A type of fingerprint pattern that consists of two separate loop formations with two separate and distinct sets of shoulders and two deltas.



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WHORL - PLAIN

A type of fingerprint pattern which consists of one or more ridges which make, or tend to make, a complete circuit, with two deltas, between which, when an imaginary line is drawn, at least one re-curling ridge within the inner pattern area is cut or touched.

Note: Many of the classification terms within this glossary are based upon the FBI's modified Henry classification definitions.

1.2.4 SWGFAST Document 19 Standard Terminology of Friction Ridge Identification

http://clpex.com/swgfast/documents/terminology/121124_Standard-Terminology_4.0.pdf

1.2.5 ASCLD-LAB

<https://www.anab.org/>

1.2.6 Additional Definitions Michelle Triplette's Fingerprint Terms:

<http://www.fprints.nwlean.net/a.html>