

**MMIE SOP-12 Enhancement of Image Files & Image
Media**

Approved by Director: Dr. Guy Vallaro

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A. Purpose:

Images are often limited/confined to the number of pixels per inch (ppi) to provide the best resolution. Other limitations are set by the camera settings and quality of the optical device. Due to these limitations, enhancements are usually applied by using specific filters to improve the visibility of subtle or latent details to provide the best visual image possible for viewing.

B. Responsibility:

Forensic Science Examiners

C. Procedure:

1. Digital image files will be imported with the appropriate media device. If images are provided on a rewritable digital media, precautions will be taken to prevent information from being written onto the submitted evidence during acquisition of files.

If media is to be inserted into a computer, every effort will be made to check for viruses using proper security software.

2. The original file shall be saved as a copy and adjustments/enhancements shall be performed on this working copy.
3. Adjustments and enhancements using the following filters/applications may be applied: levels, curves, deinterlace, channel mixer, reduce noise, sharpen/unsharpen, sharpen more and invert, desaturate, remove moiré, crop/stitch and resampling, difference/averaging filters.

The following descriptions are filters and other applications that may be used in the examination and enhancement of digital image files:

Blur: This effect softens the edges or reduces detail in an image.

Brightness & Contrast: This effect adjusts the brightness and contrast of the color tones located in the segment or frame of video.

Channel Mixer: Adjustment of color in an image by choosing a RGB (red, green, blue) channel to adjust the intensity and saturation of that hue in an image.

Deblur (lens and motion): This filter attempts to correct the pixel alignment to adjust a blurred image due to the lens focus being incorrect or the motion of an object in the image.

DeInterlacing: The ability to view either the odd or the even field of a video image frame.

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Desaturate: Desaturation is the adjustment of the red, green and blue channels towards the gray spectrum. Creates a black and white in the RGB mode.

Difference/Averaging Filter: Traditional photographic technique used to enhance the detail of an image by reducing the amount of noise or static. Combines two or more exposures of the same scene to bring out detail and obtain a richer and more vivid photograph.

Dodge/Burn: Traditional photographic technique to light or darken specific areas of a print by regulating the exposure.

Invert: This effect inverts the color information of an image. This technique may be used to bring out patterns or details from an image.

Levels/Curves: The levels effect adjusts the brightness/contrast of a clip. It combines the functions of the color balance, gamma correction, brightness, contrast and invert effects.

Lucis Pro®: Photographic filter that enhances images by adjusting high, medium and low contrast areas and corrects exposure levels.

Resampling: the addition or removal of pixels to prevent the loss of image details during the enlargement of an image.

Reduce Noise: Image noise appears as random extraneous pixels that are not part of the image detail. Image noise can appear in two forms: luminance (grayscale) noise that makes an image appear grainy and color noise that appears as colored artifacts. The filter reduces luminance noise through adjustment of the blue channel. Color noise is reduced by the filter by adjusting the color channels.

Reduce Moire: Moire is patterns caused by interference between two sets of grids. These are commonly encountered in scanned images and in images with fine linear patterns. The filter adjusts the horizontal and vertical lineup of the pixels and softens the edges of the pixels.

Scale or Magnify: The ability to zoom in or zoom out of a image.

Sharpen/Sharpen more filters: Improves image clarity and emphasizes small details and sharp contrasts.

Shadow/Highlight: Photographic technique that adjust the exposure levels in highlighted or shadowed area of an image/video.

Stiching: Allows the creation of photos with higher resolution or wider view. This stitching provided a seamless joining of multiple digital images.

Unsharpen: Filter applied to soften the pixel edges.

4. After analysis of the image media is completed, save any image files in the examiner's case folder on the computer and a copy of this file should be transferred onto a CD/DVD for archiving.
5. The submitting agency may receive a set of printed images or a compact disk containing the image files.

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6. If photographs or a media containing electronic files are generated to be disseminated to the requesting agency/customer, a sub-item will be created in the *LIMS JusticeTrax System*. This sub-item will be filed as Submission #-M# (e.g. 1-M1).

D. References:

- Adobe Corporation. (2005). *Adobe Photoshop CS2 User Guide*. San Jose: Adobe Systems Incorporated.
- Adobe Corporation. Adobe Production Suite CS5 on-line help. www.adobe.com
- Ang, T. (1999). *The Art of Digital Photography*. New York: Octopus Publishing Group.
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- Galer, M. & Horvat, L. (2001). *Digital Imaging*. Oxford: Butterworth-Heinemann.
- Johnson. S. (2006). *On Digital Photography*. Cambridge: O'Reilly Media Inc.
- SWGIT Guidelines. (2007). Special Working Group of Imaging Technology.
- State of Connecticut v. Alfred Swinton, SC 16548 (Connecticut 2004).