



**SDFI**

Secure Digital Forensic Imaging

# An Introduction to SDFI-TeleMedicine and the Negative Invert Filter

Secure Digital Forensic Imaging – Secure Beyond Reasonable Doubt!®



**SDFI**

Secure Digital  
Forensic Imaging

# HISTORY OF SDFI



- Research and Development began in **2001** and continues today.
- The first SDFI-TeleMedicine System was purchased and installed in **2005**.
- SDFI Systems are in place at **275+ locations** throughout the nation.
- SDFI has trained more than **2500 camera system users** and provides **free technical support**, to all users provided the system is utilized for medical and/or legal purposes.
- The SDFI System was specifically **designed around the Federal Rules of Evidence**, to be used by medical and legal communities.

# History of SWGIT



\*<https://www.swgit.org/history>

- By the mid 1990s, it was apparent that technologically advanced camera systems were being adopted for use in the criminal justice system. This led the FBI to convene a meeting of individuals working in the field of forensic imaging from federal, state, local, and foreign law enforcement, and the U.S. military, during the summer of 1997.

# History of SWGIT



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- As a result of this meeting, the Technical Working Group on Imaging Technology was formed from a core group of the meeting's participants. This group later became the Scientific Working Group on Imaging Technology (SWGIT).
- When SWGIT was formed, it was tasked with providing guidance to law enforcement and others in the criminal justice system by releasing documents that describe the best practices and guidelines for the use of imaging technology, to include these concerns and many others.



- “Documenting image enhancement steps should be sufficient to permit a comparably trained person to understand the steps taken, the techniques used, and to extract comparable information from the image.”



## Image Enhancement Position

- Image enhancement has been used in forensic applications since the 1840s and is an accepted practice in forensic science, regardless of whether it is performed in a traditional wet chemistry darkroom or in a laboratory equipped only with electronic devices, such as computers, scanners, and/or video capture systems.



# Image Enhancement

- The software enhances photographs by improving sharpness and image contrast; nothing is added to the image.
- Enhanced pictures are not changed or cut and pasted to create new images
- The original files are saved as a special type of file format that makes it impossible for the user to alter the original file in any form.\*

\* SDFI Camera System(s) shoot in both RAW and JPG.





## Enhancement Techniques

- Positive to negative conversion
- By changing the numerical value of a group of pixels, we can change the way the image appears to the viewer.

*\*Filters **CANNOT AND DO NOT** determine intent or cause, consent or non-consent, guilt or innocence, diagnose or analyze or distinguish right from wrong. They help you see better.*

Information provided by Erik Berg - <https://archives.fbi.gov/archives/about-us/lab/forensic-science-communications/fsc/oct2000/berg.htm>



## Enhancement Techniques

- By maintaining both the original image and the enhanced version it becomes an easy task to satisfy disclosure requirements. It is also relatively easy to demonstrate the entire procedure for the defense or even a jury.

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## Enhancement Techniques

- Explaining the technology in terms a jury can relate to will help fend off attempts by the defense to confuse and misdirect the jury.
- A computer does only what it is programmed to do.

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Information provided by Erik Berg - <https://archives.fbi.gov/archives/about-us/lab/forensic-science-communications/fsc/oct2000/berg.htm>



## Enhancement Techniques

- Aside from testifying that an image is a fair and accurate representation of the item it depicts, the expert must also be able to document the steps taken to protect the image from tampering by unauthorized persons.\*
- The goal in imaging should be the same goal all forensic experts strive for: *a stipulation to the facts.*

*\*SDFI-Telemedicine provides step by step guides to SDFI System users on how to apply the NIF to images in the SDFI Image Management software.*

Information provided by Erik Berg - <https://archives.fbi.gov/archives/about-us/lab/forensic-science-communications/fsc/oct2000/berg.htm>



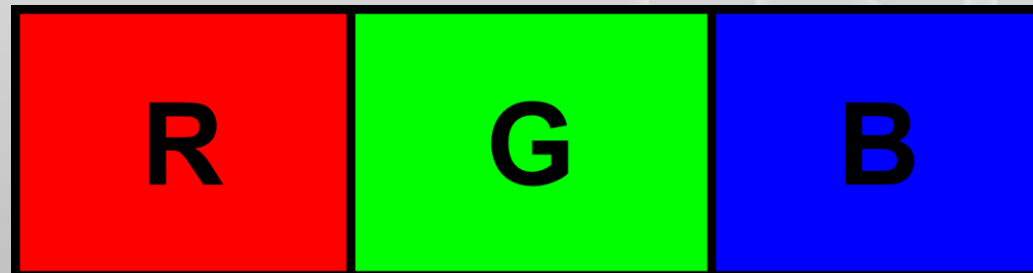
## *An Introduction To Forensic Digital Photography*

### Where Does Digital Picture and Screen Color Come From?

“MOST” digital cameras and computer screens produce images by mixing colors together.

Three Primary Colors Are Used.

What Are They?





**0 To 255  
Possible  
Reds**

**(256 Choices)**

**0 is black,  
255 is  
pure red**

**0 To 255  
Possible  
Greens**

**(256 Choices)**

**0 is black,  
255 is  
pure green**

**0 To 255  
Possible  
Blues**

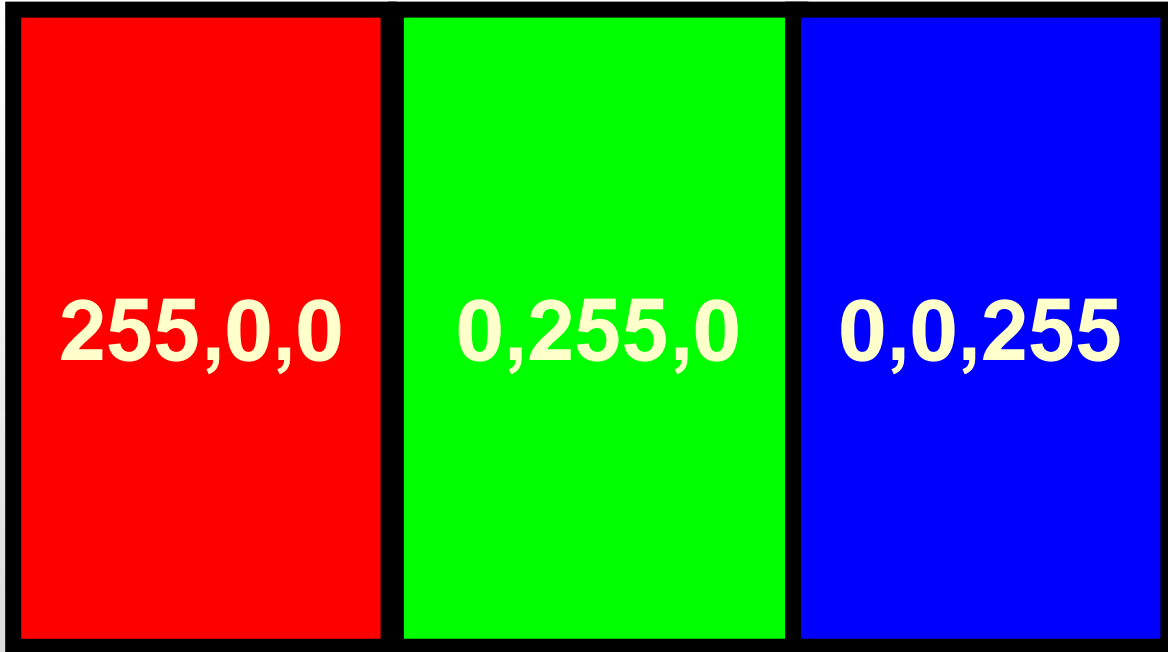
**(256 Choices)**

**0 is black,  
255 is  
pure blue**



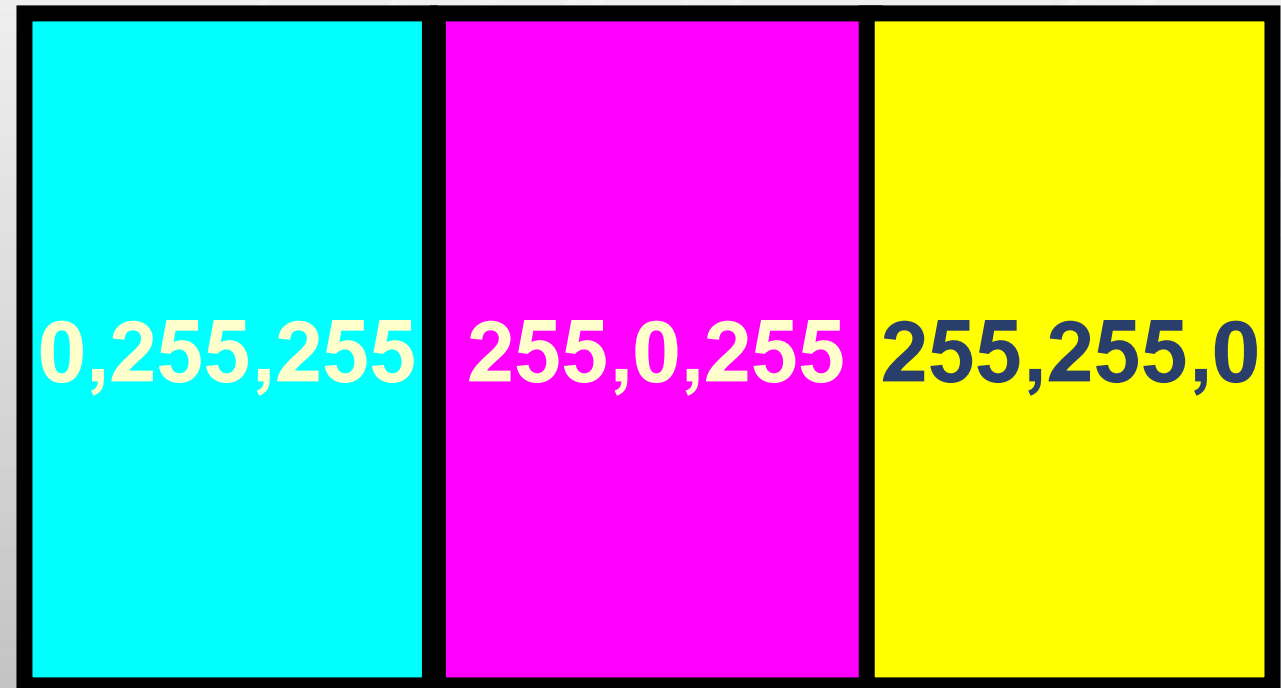
- Every pixel in a digital image can have an inverted value for the color in that pixel.
- For example:
  - If a pixel has a color value of 0,0,0 (pure black) then the inverted value is 255,255,255 (pure white)
  - If a pixel has a color value of 10,240,15 then the inverted value is 245,15,240.

\*Pixel color values are shown in an RGB order



Pure RGB Values  
Additive Colors

Inverted RGB Values (CMY)  
Subtractive Colors







## SDFI's Negative Invert Filter is applied in the SDFI Image Management software.

- The Negative Invert Filter is done using 2 keystroke:
  - Shift+N – this converts the color “positive” to a color “negative” (Changes colors from additive to subtractive)
  - i – this inverts the color values for all pixels in the image.
- The SDFI Image Management software is configured to apply the filter as a batch process, however the filter can be applied manually, one image at time, if desired.
- All images are saved as copies of the original when filtered. **THE ORIGINAL JPG CANNOT AND SHOULD NOT EVER BE OVERWRITTEN!!**

# SDFI Negative Invert Filter (NIF)

Color Positive (Original JPG)



Keystrokes



Shift+N

Color Negative (Subtractive Colors)



# SDFI Negative Invert Filter (NIF)

Color Negative (Subtractive Colors)



Keystrokes



i

Negative Inverted Filter Completed



# SDFI Negative Invert Filter (NIF)



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Never show a filtered image by itself!!

The original should ALWAYS be on the left and filtered image on the right

Color Positive (Original JPG)



Negative Inverted Filter Completed



# SDFI Photo Templates and Reference Materials



This web site is constantly being updated. Check back in for updates regularly.

- SDFI-TeleMedicine provides templates for showing images side by side.  
([http://www.sdfi.com/downloads/SDFI Powerpoint Photo Templates.zip](http://www.sdfi.com/downloads/SDFI_Powerpoint_Photo_Templates.zip))
- All reference materials are also available on our website  
(<http://sdfi.com/Downloads.asp>)

- Download Everything On This Page as a .ZIP File
- U.S. Army, Certificate of Networthiness (CoN)
- **SDFI's Adult Non-Fatal Strangulation Protocol 2018**
- **SDFI's Pediatric Non-Fatal Strangulation Protocol 2018**
- **SDFI's Pediatric Non-Fatal Strangulation Protocol 2018-Portuguese**
  
- **SDFI Technical Requirements 2018**
- SDFI General System Security 2018
- SDFI File Portal Security 2018
- SDFI's White Reference Guide 2018 - *(Includes all references)*
  
- **Using SDFI's Negative Invert Filter In Court 2018**
- Learn About SDFI's Negative Invert Filter 2018 *(Includes image examples)*
- SDFI's Blue Negative Invert Filter Guide 2018 - *(A How To Guide)*
  
- Forensic PhotoDocumentation Protocol 2018
- SDFI's Yellow Secure File Download Guide 2018 - *(A How To Guide)*
- SDFI Bookend Card (Print in a pinch)
  
- SDFI Is Beyond HIPAA Security 2018 - *(Includes all references)*
- **Forensic Exams and HIPAA 2018 - (Includes all references)**
- Federal Rules of Evidence (Dec. 1, 2016 is the most current version.)
  
- The NCA 2017 Edition of the Standards for Accredited Members - *(Not in the Zip File)*
  
- Department of Health and Human Services Centers for Medicare & Medicaid Services 2017 Telehealth Services
  
- SDFI Powerpoint Photo Templates 2017.zip



# Case Law



## ***CASE LAW***

Many cases exist in various courts throughout the United States and other countries where digital imaging technology has been challenged and successfully admitted into evidence. This section of the document is designed to provide the reader with case law citations in which issues of admissibility have been addressed. This list is intended as a starting point for researching such case law.

### ***ISSUE: Digital Manipulation vs. Processing***

***CASE: English v. State, 422 S.E.2d 924 (Ga. Ct. App. 1992)***

***CASE: US v. Mosley, 35 F.3d 573 (9th Cir 1994)***

***CASE: Nooner v. State, 907 S.W. 2d 677 (Ark. 1995)***

***CASE: Washington v. Hayden, 950 P.2d 1024 (Wash. App. 1998)***

***CASE: US v. Beeler, 62 F. Supp. 2d. 136 (D.Me 1999)***

***CASE: Dolan v. State, 743 So. 2d 544 (Fla. App. 1999)***

***CASE: State v. Hartman, 93 Ohio St.3d 274 (Ohio 2001)***

***CASE: Rodd v. Raritan Radiologic Associates, PA et al., 860 A.2d 1003 (N.J. Super. 2004)***

***CASE: Kennedy v. State, 853 So. 2d 571 (Fla. App. 2003)***

***CASE: Hartman v. Bagley, 333 F.Supp. 2d 632 (N.D. Ohio 2004)***

***CASE: State v. Swinton, 847 A.2d 921 (Conn. 2004)***

# Questions?

For support please contact [Support@SDFI.com](mailto:Support@SDFI.com)

[www.SDFI.com](http://www.SDFI.com)

310-492-5372