

Advancing the Science of Fingerprint Detection

DCS[®] 5

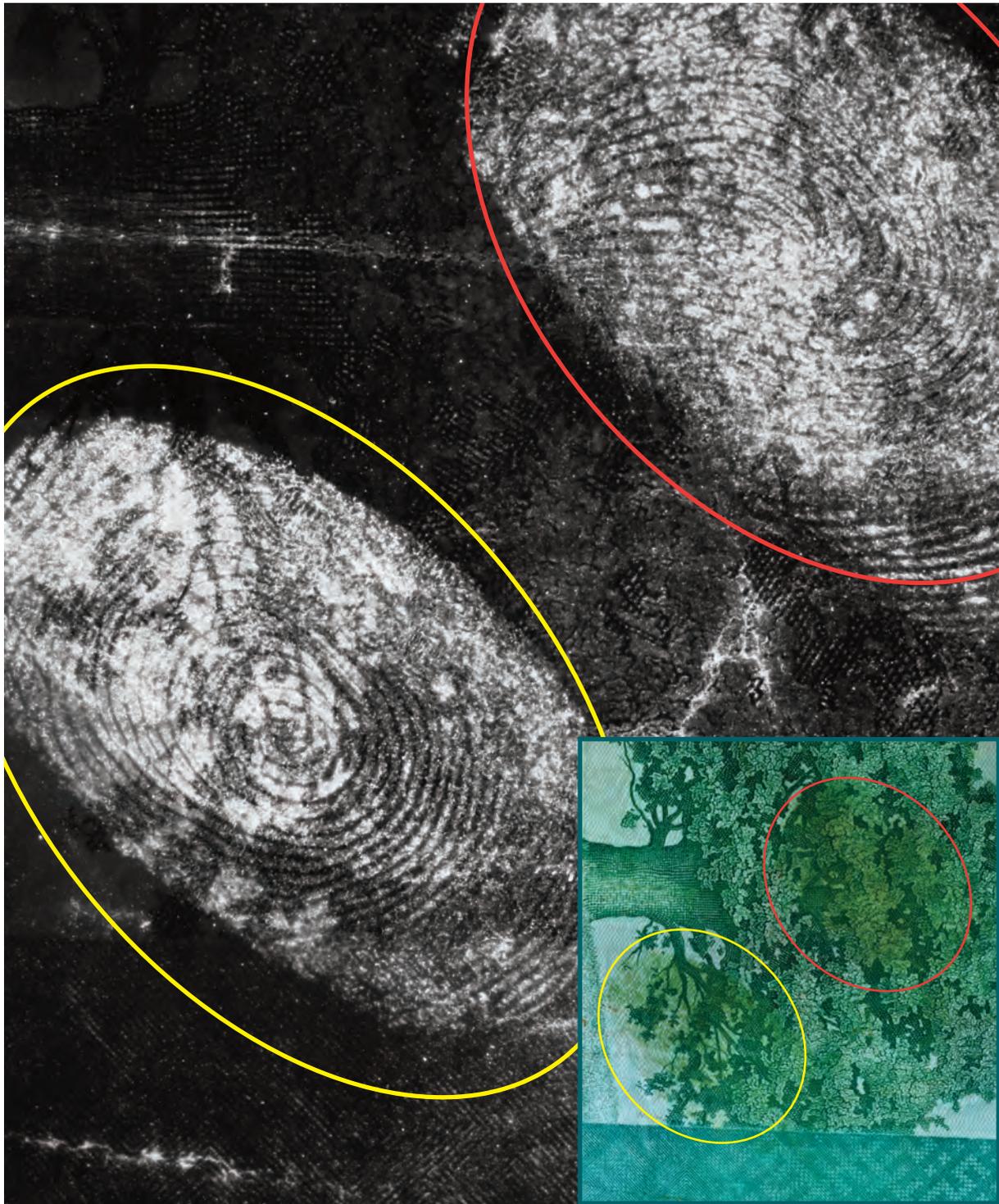
UV | VIS | IR

Fingerprint Imaging Workstation



DCS[®]5 Advancing the Science of Fingerprint Detection

DCS 5 reveals fingerprints on a densely patterned banknote dusted with *fp*NATURAL 1, Foster + Freeman's new IR fluorescent powder



Advanced fingerprint capture & enhancement



DCS[®] **5**

UV|VIS|IR

DCS 5 is a comprehensive imaging system for the detection, capture and enhancement of almost any type of fingerprint on any surface or background to ensure that maximum detail is revealed.

Not only does the DCS 5 high resolution camera (fitted with application specific macro lenses) produce images of exceptional quality, advanced digital enhancement, applied simply, maximises print detail to improve the value of evidence.

Precise wavebands of illumination from UV through the visible to IR are provided to improve the visualisation of every type of fingerprint whether it be latent, contaminated or chemically treated.

DCS⁵

Imaging Techniques

Fluorescence Imaging

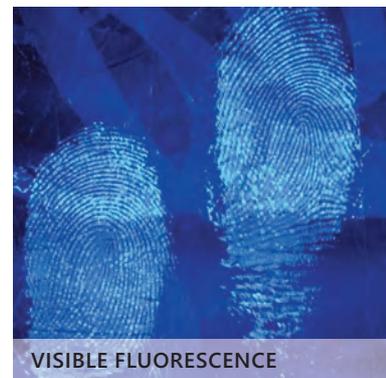
Many latent fingerprint treatments such as Ardrox, DFO, BY40 and fluorescent powders fluoresce under specific wavelengths of light.

Using the DCS 5 multi-wavelength ring light an operator is able to select the optimum wavelength to generate the maximum intensity of fluorescence for each type of treatment.

Plastic bag treated with Polycyano UV and examined under UV illumination.



ORIGINAL



VISIBLE FLUORESCENCE

Infrared Imaging

Interfering backgrounds may be suppressed appearing white as they reflect IR whereas some chemical treatments such as Physical Developer and certain powders absorb IR and appear black.

Foster + Freeman's new fingerprint dusting powder 'fpNatural 1' fluoresces brightly in the infrared when illuminated with red light. Its application has the advantage of eliminating interference from most backgrounds which rarely fluoresce at this wavelength.

Polymer banknote treated with fpNatural 1 IR Fluorescent Powder, illuminated with red light using the Crime-lite 8x4Mk3 and viewed in the IR.



ORIGINAL

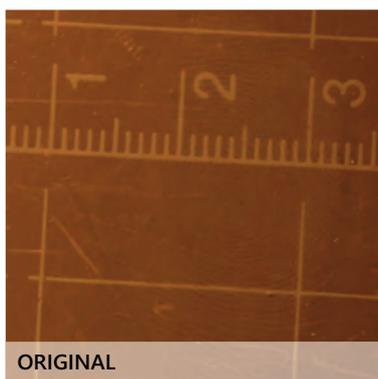


INFRARED FLUORESCENCE

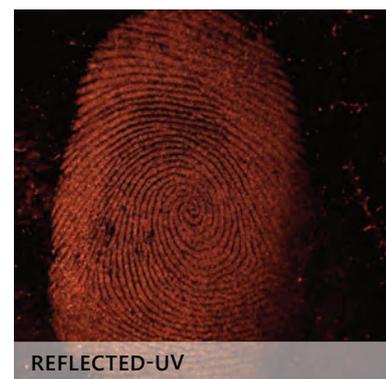
Reflected longwave UV Imaging

Many surfaces such as glass and plastics absorb UV and appear black, which improves the visibility of both treated and untreated latent prints which often reflect UV. Images can then be significantly enhanced using the DCS5 software.

Untreated latent fingerprint on clear perspex. Perspex appears black when illuminated and viewed under UV revealing the fingerprint which reflects UV.



ORIGINAL



REFLECTED-UV

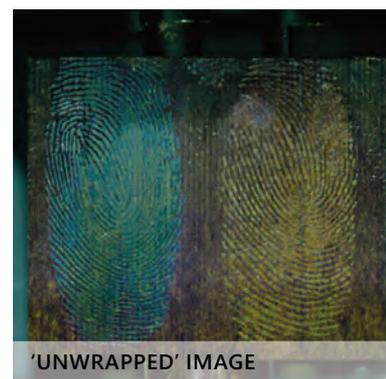
Cylindrical Surface Unwrapping

The DCS5 Cylindrical Surface Unwrapper (CSU) enables 2D images of fingermarks to be extracted from narrow cylindrical items including bullets, pens, batteries, glass vials, bottles, syringes, hand tools and other similarly shaped objects.

Using the CSU to capture and 'unwrap' images of fingermarks on bullets



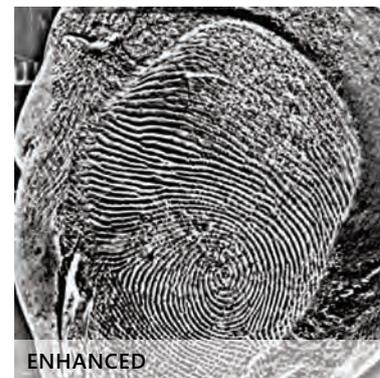
LOADING CSU



'UNWRAPPED' IMAGE

DCS[®] 5

Enhancement Software



Digital Enhancement

An integral part of DCS 5 is the easy-to-use software that provides sophisticated image processing and enhancement tools to uncover hidden detail within images.

Operated via simple drop down menus, DCS 5 enhancement software enables the operator to remove textured or 'difficult' backgrounds as well as enhance prints developed using a variety of chemical treatments, dyes, stains and dusting powders including the new IR powder. Each toolbox offers the operator 'tried & trusted' enhancement programmes that enable complex processing routines to be performed with a single button press.

Ninhydrin developed fingerprint on a multicoloured patterned background. DCS 5 enhancement software can improve the clarity of fingerprints by removing or reducing backgrounds.

Fingerprint illuminated with the dark field ring light and enhanced using the dedicated 3-D enhancement software.

Image Validation & Audit Trail

Encryption software protects all original fingerprints captured by the system. Images that are enhanced or processed in any way automatically lose their status of authenticity with full details of each process being recorded in a detailed Audit Trail.

Essential when presenting courtroom evidence, audit trails detail every step taken during the capture and enhancement process together with information about the operator, computer and software used to perform enhancements. Audit Trail descriptions are in simple to follow language to aid presentation.

Interactive Guidance

DCS Wizard provides an interactive step-by-step guide to achieving consistently high quality images of fingerprints.

By following intuitive steps to select the exhibit type, surface type, chemical processes, and background data the user will be presented with suggestions on the lighting, filters, excitation wavelengths and camera settings required to achieve the optimum print definition and contrast every time.

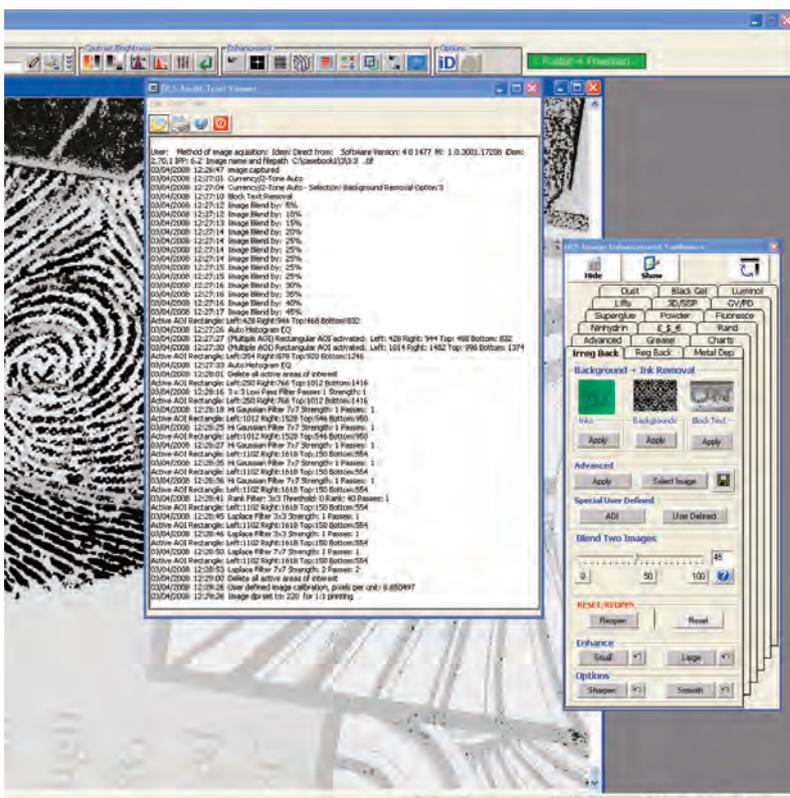
Comparison & AFIS Search

An optional software module enables the user to display two fingerprint images, side-by-side, for comparison and enhancement.

Providing intuitive control of image zoom, orientation and visual enhancements, the module provides a practical digital alternative to the traditional manual method of fingerprint comparison.

In addition, the module provides an affordable AFIS capability allowing users to create and manage databases of up to 5,000 records.

1:n and 1:1 fingerprint searches are fast and effective, saving days of manual search time.



DCS[®]5

System Components

1 Camera

custom-modified digital SLR camera

In order to achieve excellent image quality, the DCS 5 has been built around a pro-grade DSLR camera customised by Foster+Freeman for UV-Vis-IR imaging applications.

Nikon's full-frame flagship camera, the D5 takes advantage of huge advancements in sensor design to deliver images of exceptional clarity across the spectrum.

1



Lenses

A choice of specialist lens provides greater control of the image captured by the camera.

2 105mm Vis-IR Macro Lens

for general imaging

Focusing up to 1:1 life size in auto or manual focus modes images remain sharp at every distance.

2



3



4



3 60mm UV Transmitting Lens

for reflected UV imaging

This quartz/fluorite lens, is essential for Reflected UV Imaging but also provides excellent results in the visible and IR.

4 85mm Vis-IR Tilt/Shift Lens

for depth of field control

With a revolving capability of + or - 90 degrees this high performance lens enables selective focussing of images across different focal planes in the visible and IR wavelengths.

5



6



5 Copy Stand & Accessories

for accurate, repeatable image alignment

Professional photographic copy stand includes a 1.2m column and transmitted light base.

Accessories include camera lens bellows and variable friction light source mounts

6 Cylindrical Surface Unwrapper

extract 2D images from 3D cylinders

Uniformly rotates cylindrical objects such as pens, bullets, pipes, tubes etc. while the DCS system captures, stitches and blends a series of images together to create a single 2D image of the fingermark.

1



2



3



4



5



6



1 Multi-wavelength Ring Light

The Crime-lite 8x4Mk2 provides intense white, UV, violet, blue, blue/green, green, orange and red narrow waveband light for visible and fluorescent image examinations.

2 Halogen Light Source Package

Intense 150W light source with 5 coloured filters for general contrast imaging. To be used in conjunction with the fibre optic light guides for directional lighting on any surface type.

3 Forensic Light Source (FLS)

A continuous 400-1000nm narrowband light source used in conjunction with the fibre optic light guides provides specific wavelengths of light for improved contrast imaging and removal of interfering backgrounds.

4 IR Imaging Crime-lite 8x4Mk4

A specialized LED ring light providing intense blue and red light for generating infrared fluorescence from specialist dusting powders such as fpNatural 1. Also includes near-IR 'light' for examining fpNatural 2 powder and fingerprints in blood or treated with Physical developer or Powders.

5 UV Light Source

The Crime-lite 82S fitted with 16 UV LEDs. Provides more intense UV at 365nm for generating fluorescence from treated fingerprint images and reflected UV images.

6 Fibre Optic Light Guides

Flexible directional light guides to illuminate any evidence type;

Ring Light

Diffuse, uniform illumination for flat items such as paper, banknotes or coloured plastic.

Backlight/Paddle Light

For transmitted illumination for lifts, clear plastic, cellophane or for specular illumination for prints on reflective surfaces.

Darkfield Ring Light

360° oblique illumination for 3D impressions in soft materials.

Twin arm Goosenecks

Dual directional illumination for curved or reflective surfaces.

Coaxial Light

For reflective surfaces including mirrors & CD's.

DCS[®] 5

SYSTEM DESIGN

BY APPLICATION

In order to accommodate the differing requirements of fingerprint laboratories worldwide, **DCS 5** is a modular system that can be expanded through the addition of application specific modules.

The **DCS 5 core** provides a complete solution to the capture and enhancement of fingerprints within the visible spectrum and includes a Windows PC running the DCS 5 Software, a pro-grade photographic copy stand and a selection of light guide clamps and mounts.

Additional modules can be selected to provide IR, Reflected UV and Shift/Tilt Imaging capabilities.

DCS 5 core

image capture

- Nikon D5
 - Custom-modified camera
 - 20.8 million effective pixels
 - 35.9 x 23.9mm CMOS sensor
- 105mm Macro Lens Kit
 - For visible imaging
 - Circular polarizing filter
 - Visible pass filter
 - Filter step ring
- Infrared Imaging Filters
 - 715nm IR imaging filter
 - 780nm IR imaging filter
 - 850nm IR imaging filter

illumination

- Forensic Light Source (FLS)
 - 100W halogen lamp
 - 400-1000nm continuous bandpass filter
- Halogen Light Source
 - 150W halogen lamp
 - Variable dimmer control
- Fibre Optic Light Guides
 - 4" Ringlight
 - Backlight
 - Coaxial light box
 - Twin arm goose neck
 - Dark field ring light
 - Flexible fibre bundle
- DCS Light Guide Clamp Set
 - A selection of clamps and flexible arms for the positioning of light guides

DCS 5 essentials

- Pro-Grade Copy Stand
 - + Ring Light Mount
 - + Camera Filter Pouch
 - + Camera Filter Step-ring
 - + DCS Photography Pack
- Desktop PC
 - + 32" 4K UHD Monitor
 - + Photo Printer
- DCS 5 Software
 - + Image Pro Analyser
 - + VeriData iDem
 - + DCS Wizard

Application specific modules

+Visible Fluorescence Imaging

- Multi-waveband Ring Light
 - 32x high intensity LEDs
 - White, UV, Violet, Blue, Blue/Green, Orange and Red illumination
 - Set of 12 slot-in fluorescence viewing filters
 - Filter storage case
 - Ambient light shielding lens bellows

+Infrared Imaging

- N-IR Imaging Ring Light
 - 32x high intensity LEDs
 - Blue, Red and N-IR LED illumination
 - Set of 4 slot-in fluorescence viewing filters
 - Filter storage case
 - Sample of *fpNatural1* IR fingerprint powder
 - Sample of *fpNatural2* NIR fingerprint powder

+Cylindrical Surface Unwrapping

- CSU device with USB3.0 connectivity
 - Max. Dimensions (mm): 85x330x110 (WxLxH)
 - Internal and external clamping jaws
 - Internal clamping range: min Ø5- Ø55mm
 - External clamping range: max Ø45mm
 - Max length of object as standard: 200mm
 - 12V Power input
 - Includes electronic digital Vernier caliper

+Shift/Tilt Imaging

- 85mm Shift/Tilt Lens Kit
 - Manual focus lens with shift and tilt control
 - Circular polarizing filter
 - Visible pass filter
 - Filter step-ring
- * Requires macro extension tubes

+Reflected UV Imaging

- 60mm UV/Vis/IR Lens Kit
 - Macro lens with 310-1100nm transmission
 - 330-385nm bandpass filter
 - Circular polarizing filter
 - Visible pass filter
 - Filter step-ring
- * Requires macro extension tubes

+Comparison & Search

- FCS Software Module
 - Side-by-side analysis tool
 - Create and search against databases

+Footmark Imaging

- Line Light Attachment
 - For use with FLS or Halogen Light Source

To request a formal DCS 5 sales quotation, please contact your local Foster + Freeman sales representative providing details of the modules you would like to add to your system.

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