



The **Satscan-Tray** scanner is a breakthrough in technology allowing you to create massive resolution images of your subjects and store them to disk.

This new concept is radically different to any conventional scanners, instead of a simple linescan camera we employ a high resolution, live image digital camera which is precisely moved over the subject on a motorized gantry. Individual images at each location are captured, stored and accurately reassembled in software as the ultimate, defining image of your subject.

The scanner can be constructed to a custom size up to 6m x 6m.
Standard sizes provide scanning areas of:

- 0.5m x 0.5m
- 1m x 1m
- 1.5m x 1.5m

Every aspect of this scanner has been meticulously developed to provide outstanding images at the highest achievable resolution, which can be hundreds of times higher than a conventional digital camera.

Satscan-Tray

**Extensive area scanning of
2D & 3D objects
at amazing resolution**

Preserve your collections by scanning them at the highest possible resolution

Reduce future specimen handling and disturbance

Make your collection available digitally

Freeze the condition of your collection in time

- Scanners can be built up to 6m x 6m in size
- Up to 23,000 x 23,000 pixels x 24 bit colour
- Large depth of focus
- Superb, reflection minimised, illumination
- Outputs large image files to archive
- Compression options
- Includes sophisticated scanning software with simple user interface with quick preview
- Vertical position of camera ensures that sides of boxes do not occlude the specimens

Incorporating our own novel technology:

- **SD Corstitch** - correlation image stitching technology
- **SD Encode** - super accurate linear encoder positioning technology
- **SD HFCam** - Special stabilized camera mounting technology

At last, a perfect solution for scanning large objects, applications include:

- Scanning multiple trays of specimens from important collections:
 - Natural History Collections such as entomological and botanical archives
 - Archaeological Collections
 - Palaeontological Specimens
- Manuscript scanning
- Works of Art
- Archaeology Dig Sites
- Forensic Scenes of Crime

You can't get higher resolution than this

This unique system gives you the ability to scan your specimen to a resolution of typically 10 microns per pixel with the standard lens and even higher with a microscope head attached. For instance a drawer of 1mx1m in size of specimens from a museum collection can be scanned to produce a 100MegaPixel image (yes, 100 million pixels).

Data handling all taken care off

With this amount of data the computer supplied with the system has a special configuration with massive storage and data writing facilities.

Easy-to-use

To create a scan you simply need to position your objects under the camera gantry, set the focus, aperture and a zoom magnification level. Then you can create a quick preview scan, select the area of interest and start the full resolution scan.

Full motorisation and remote control

Every aspect of the system has been designed to be as remotely controllable as possible. The following components on a standard system are fully motorized and/or under remote control in the software as storable parameters:

- Gantry XY Motors
- Camera including:
 - electronic shutter
 - Lens Focus
 - Aperture
 - Zoom/Mag

Highly 3 dimensional
37,000 year old
bear paw
from Romania.
Scanned at relatively
low magnification
creating an image
7532 x 10515 pixels
x 16.7 million colours

Courtesy of the DM Collection

Large depth of focus

Note the seamless stitching
of adjacent images in this
composite image despite
significant shadows



Illumination for every type of specimen

Easily overlooked, as all photographers know, is the illumination of specimens which has a profound effect on the quality of the images captured. It is even more important when stitching adjacent images together because variation in illumination can create sharp boundaries between images which can spoil the appearance of the stitched image overall.

A program of careful testing of a diverse range of illumination techniques has resulted in a set of specially developed solutions designed for each size of scanner and subject type.

With high intensity light sources the lens and camera apertures can be kept partially closed resulting in extended depth of focus without compromising optical clarity.

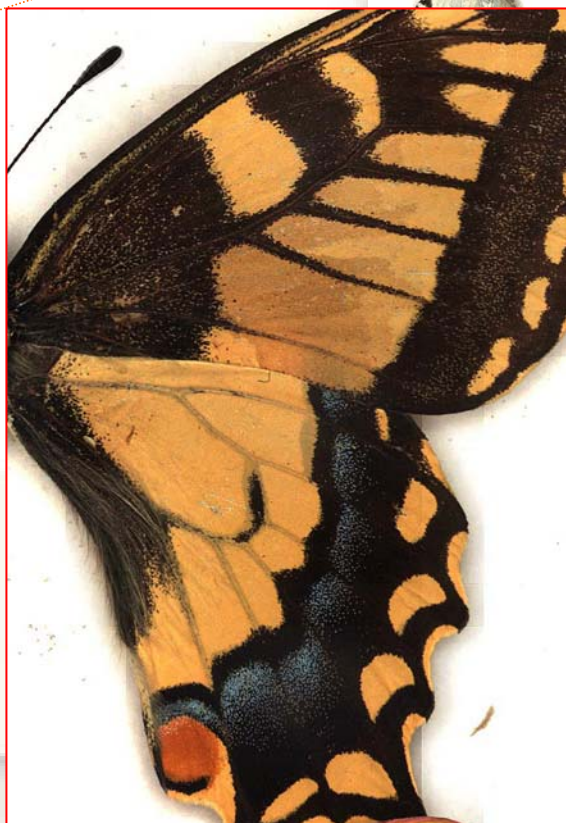
Diffuse light sources are used to minimise reflections, high frequency lamps eliminate camera interference and cool light sources reduce subject damage.

Quality images from quality optics

A crucial part of any imaging system is the optical assembly. We have designed a set of optics that are distortion-free, telecentric and fully motorized.

High performance camera

The resolution of the digital camera in a system like this is not as important as its remote controllability, speed of data delivery, quality of the image and color correctness. We are using a family of cameras perfectly matched for this task, this family includes a 3CCD model with perfect color reproduction. For increased scan resolution it is better to magnify the subject further using the zoom on the lens and capture more images.



A perfectly scanned 1920's butterfly collection with high intensity, high frequency, large area diffuse light source creates an image of 5739 x 7667 pixels x 16.7 million colours

Courtesy of the BTKL Collection

Perfect color reproduction



Automatic Position Logging

The camera is mounted on a specially designed stabilized camera mounting system **SD HFCam** which resists vibration and inconsistencies in rest positions. The camera mounting is driven by high accuracy stepper motors over ultra-smooth bearings to within 2 microns of the requested XY coordinate. Even with the positional accuracy of the stepper motors further accuracy is obtained from 0.1 micron precision linear encoders that measure the rested position when each image is captured. Each image is then stored along with its stepper position and encoder position for analysis by the control computer.

Correlation Stitching for Precise Results

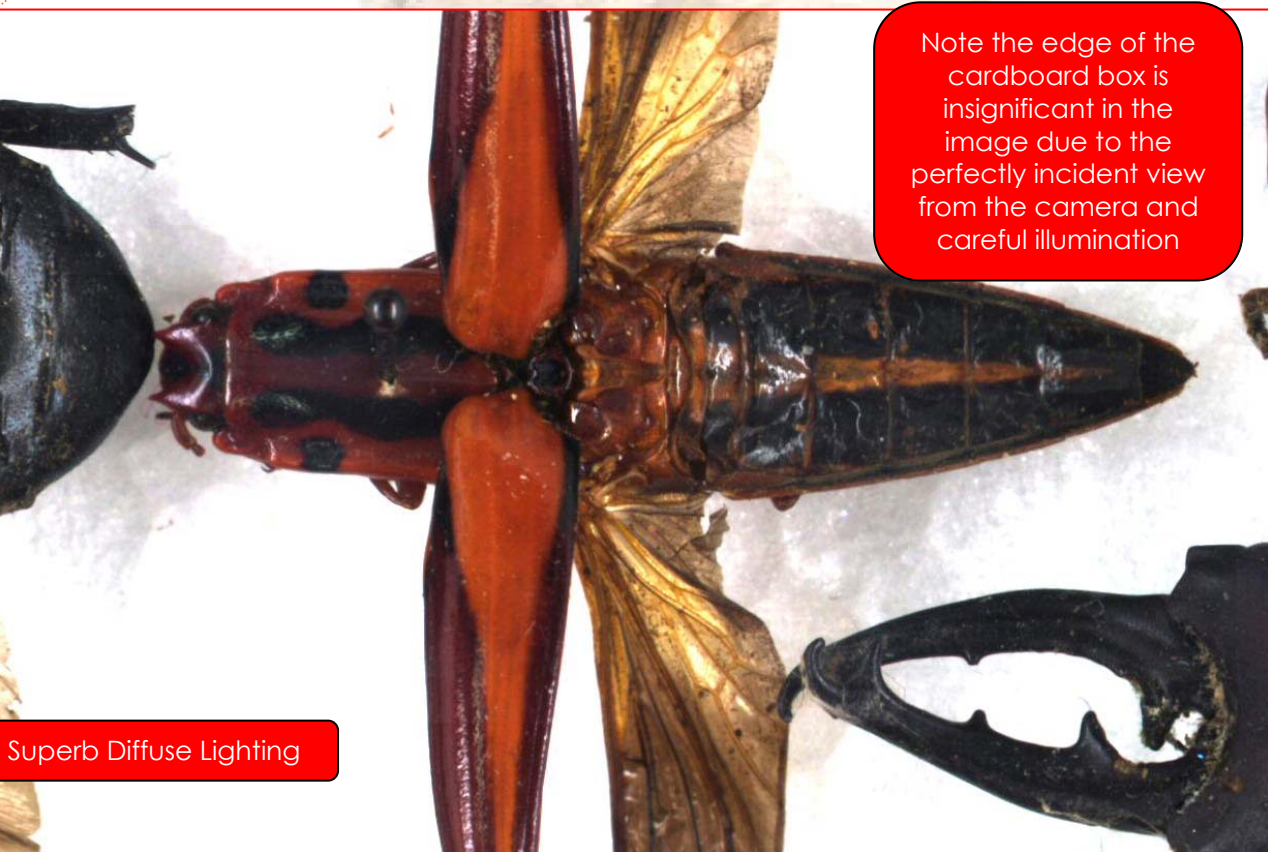
Even with the superb positional accuracy of the scanner, simply stitching the images together using the electro-mechanical position data is not enough. This has been a major weakness in all other attempts to create this type of scanner. Usually the user is simply left with a collection of individual images and little or no attempt is made to stitch the images into a massive composite scene to generate a single image file. We have developed special correlation stitching technology which not only reads the stepper and encoder location data but also compares the images using cross correlation algorithms and fits them together into a superbly stitched composite image. This technology is known as **SD Corstitch** and represents a breakthrough in scanner technology.



A beetle collection beautifully imaged. These subjects are notoriously difficult to illuminate satisfactorily. image is 5796 x 7438 pixels x 16.7 million colours

Courtesy of the KLOET Collection

Note the edge of the cardboard box is insignificant in the image due to the perfectly incident view from the camera and careful illumination



Superb Diffuse Lighting

About GT Vision

GT Vision specializes in the supply of imaging, microscopy and automation products for education, science and industry. Concentrating on their core expertise in these areas GT Vision offers products that apply cutting edge technology to elegantly solve imaging related quality and productivity problems. With offices in the USA and Europe, divisions supporting specific customer groups and a growing number of overseas distributors, GT Vision is rapidly emerging as the preferred supplier to major institutions and industries for these specialist areas.

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