

# SatScan™ Art

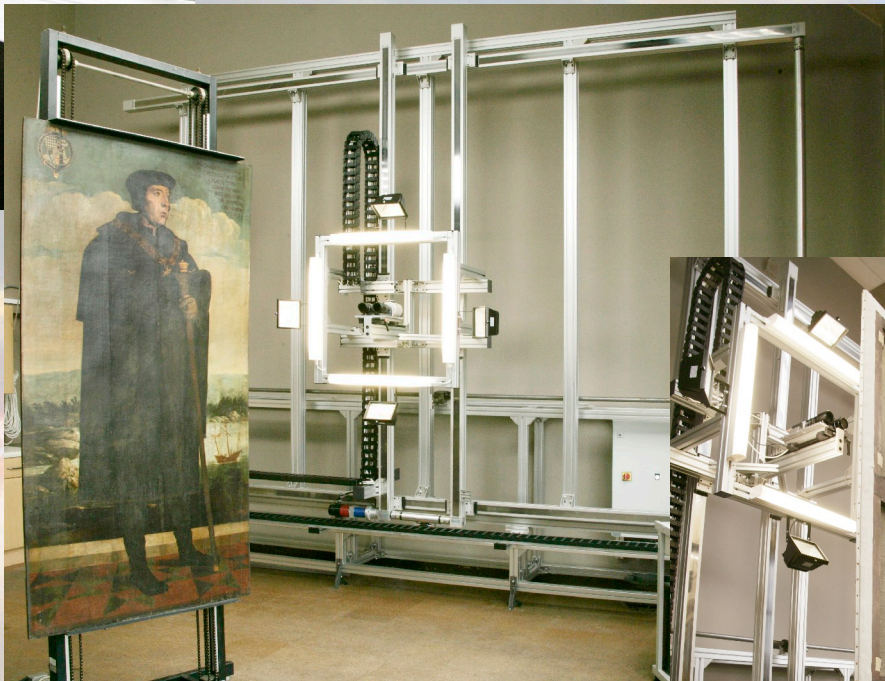
by smartdrive



SatScan is a revolutionary technology which glides over works of art surveying and gathering digital data; creating stunning ultra-high resolution images with extraordinary detail and clarity. In minutes huge areas are scanned and preserved in visible spectra, Infra-Red and UV often revealing fascinating never seen before features from the original masterpiece.

*Ideal for:*

- ✓ Research institutes
- ✓ Restoration studios
- ✓ Galleries
- ✓ Museums
- ✓ Private collectors
- ✓ Auction houses



A unique combination of automation equipment with state of the art software to provide automated capture and assembly of multiple fields of view to generate extremely high resolution images. Multiple fields are achieved by moving a head carrying lighting and cameras across a subject painting and taking digital images at precisely monitored positions. This information is then passed over to the bespoke SatScan software, which proceeds to automatically stitch adjacent fields to produce a high resolution output. The intelligent stitching algorithm is able to stitch adjacent fields accurately, even with very little visible data present within the images to produce an incredibly high resolution image over the whole painting.



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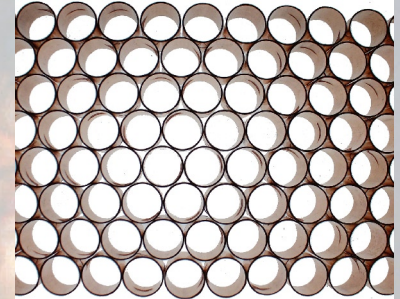
## Ultra- High Resolution

The unique blend of technologies utilised in SatScan Art allows large items to be imaged at resolutions far higher than any current standard digital camera is capable of achieving and without the many forms of associated artifacts and lens distortions that would otherwise be present. The images of the copper tubes to the right highlight this effect, the image taken with a conventional digital camera shows clear rings in the centre, but increasingly shows the tube walls towards the edges along with lens induced scale distortion; in the image produced by SatScan all the tubes are shown perpendicularly with uniform scaling and no lens distortion. Whilst a certain amount of software correction can improve the effects of distortion and artifacts, it cannot fix the missing data; capturing the image correctly from the start will always produce a more accurate result.

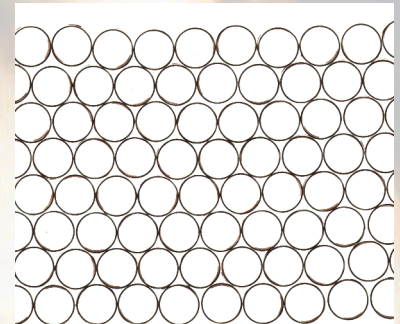
The example below is zoomed in from the larger image and clearly shows the canvas detailing that would be missing in a conventional digital camera image due to lack of resolution. Also note the lack of joint lines where multiple fields have been stitched.



## Parallax Issues



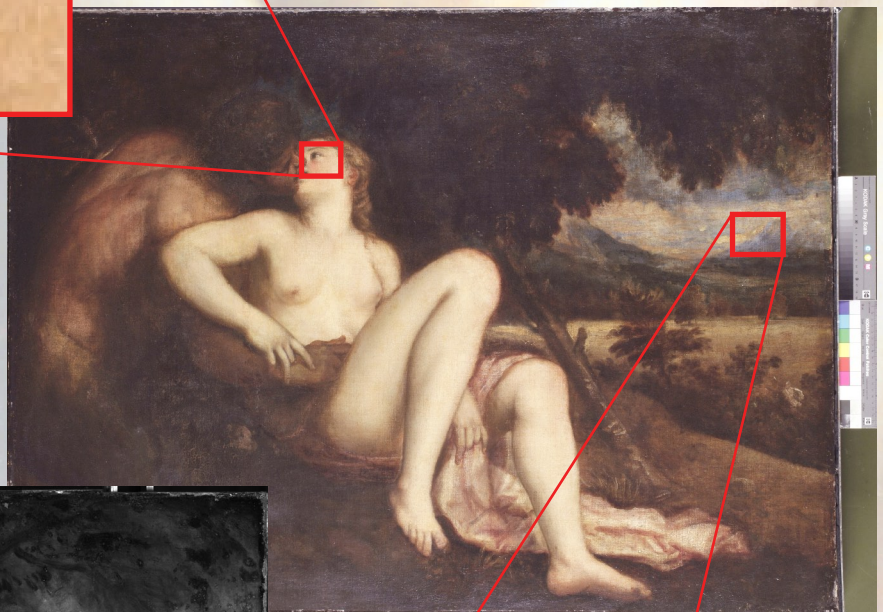
Tubes digital camera image



Tubes imaged using SatScan

## Flexibility

The flexible nature of the system hardware and software allows for multi-spectral imaging of the subject matter, from infra-red through to ultra-violet to allow hidden aspects of the subject to be made visible. Furthermore, a laser measuring instrument can be implemented to provide accurate profile data for assessing canvas and paint condition.



The image on the left was taken using the infra-red illumination

and camera and clearly shows a series of otherwise invisible marks. Knowing about the presence of these "hidden" attributes allows conservators to approach such areas with the appropriate level of care to prevent unnecessary damage; these features can also be used to verify the authenticity of pieces of artwork as copies are unlikely to contain these otherwise invisible attributes.





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## The Hamilton-Kerr Institute



An early adopter of SatScan technology has been the Hamilton Kerr Institute near Cambridge UK, a centre of excellence for conservation services that is world renowned for its research and conservation work on easel paintings and altar pieces. Working closely with the staff at the institute the team at SmartDrive devised a SatScan system capable of scanning artwork of up to 4.5x3.5m in the visible, infra-red and ultra-violet spectra along with option to add in a micron-accurate laser measurement system. The system was designed to fit within a specified space within one of the conservation studios at the institute. Installation, commissioning and training was undertaken in full co-operation with the staff at the institute to minimise disruption of the day-to-day operation of the institute.

The SatScan system is now in regular usage with the paintings being imaged in high resolution in both visible light and infra-red modes before conservation work commences allowing better informed decisions to be made before commencing the conservation work. Previously a manual imaging system was used that was both time-consuming and costly; "Imaging even a small painting was a day's work using this method," explains Chris Titmus imaging consultant at Hamilton Kerr, "And even then the complete image wasn't clean, as stitching was by eye and the edges of most images were blurred." The new SatScan system is completely automatic; "Once the work is in position we press a button, the image capture process begins and the software stitches it all together," Chris continues. "In an hour or so we can achieve what used to require a whole day. Indeed the system is also allowing us to take on work we wouldn't have considered



before. In the past it would only have been viable to look at selected areas of some paintings whereas now we can examine the whole thing."

A good example is the pictures here of Sir William Fitzwilliam, Earl of Southampton; the visible-light picture (above) shows Sir William stood overlooking a what appears to be a river scene, but when imaged in infra-red (right) it becomes clear that this painting is not in its original state - in fact it would appear that most of the background has been repainted over the top of what appears to be a traditional archway. Also brought into sharper focus is the somewhat faded tile pattern on the floor.

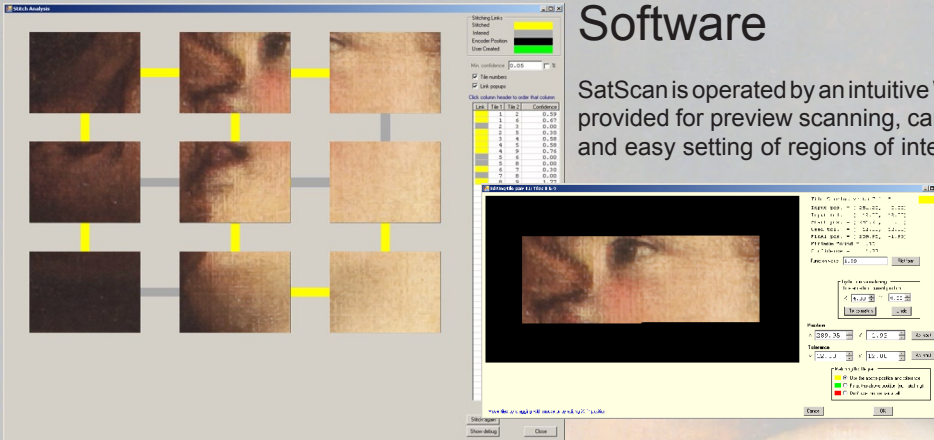
Rupert Featherstone Director of the Institute adds "The SatScan system has proven itself to be a remarkable breakthrough for art restoration and preservation, the development has provided the Hamilton Kerr Institute with leading edge technology that will ensure we continue to lead the field in conserving the nation's heritage."



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## Software



SatScan is operated by an intuitive Windows® PC control package. Features are provided for preview scanning, camera control, illumination control, calibration and easy setting of regions of interest. Also included is the facility to analyse and manipulate the individual image tiles for the areas where inadequate features are visible for correct stitching to occur. Full software training is provided as part of the installation and commissioning of each SatScan system.

## Customisation

SatScan Art has been designed from the outset for maximum flexibility. SatScan can be scaled to suit the individual customer requirements, along with selection of lighting, cameras and lenses.

## Standard Specifications:

Scan Area:	Up to 6mx6m
Image Size:	Up to 30Kx30K pixels (900 MegaPixels)
Lenses:	Navitar Zoom 6000
Working Distance:	600mm typically
Tile Size:	Zoom dependant
Spectra:	Infra Red (Typically 1000 to 1700nm) Visible Light UV Florescence
Visible Light Camera:	Basler A631fc
Illumination:	High Frequency Fluorescent (3400, 4300 or 6300K) Adjustable Halogen IR Fluorescent UV/Black Light tubes
Measuring Laser:	Optional - 50um resolution
Scanning Time:	Dependant on zoom & target size, typically under 1/2hr

## Minimum PC Requirements:

Processor:	Pentium® Core2Duo, 2GHz
RAM:	3GB
Hard disk space:	10GB free space
Ethernet Ports	1x 100BASE-TX for system control 1x Intel Pro 1000 for IR Camera
Data Ports	1x IEEE1394 Firewire port

From our Suffolk headquarters GT Vision Ltd supply Smartdrive automation and imaging solutions for science and industry. For over 25 years SD's pioneering research and development team has been at the leading edge of hardware and software design, this wealth of technical expertise is made available to you through user friendly award winning products. Whether you require standard solutions or bespoke implementations, working with us you'll be making all the right moves for stunning results.



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