



ToolScan R360

The complete solution for toolmark experts.



AUTOMATIC 3D SCANNING • MODERN SOFTWARE • EVIDENCE EXAMINATION
SEARCH • VIRTUAL COMPARISON MICROSCOPY

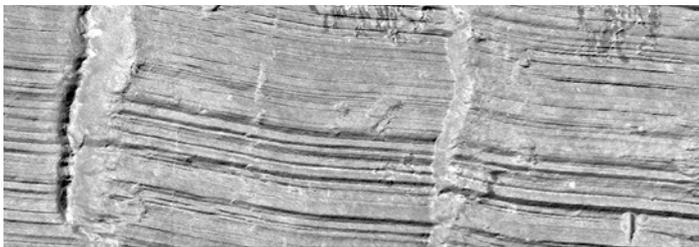


OVERVIEW

The ToolScan System by Laboratory Imaging offers a comprehensive solution for the forensic examination of tool marks. It is designed to provide live, real-time imaging and high-resolution, all-in-focus scanning of 2D and 3D images created from focus variation combined with photometric stereo.

The key advantage of the ToolScan System is its advanced forensic software, LUCIA, which is continuously updated with new features for forensic analysis.

- 3D images with a resolution of 8340 PPI.
- 2.8 MP CMOS camera.
- Robust mechanical construction (samples up to 15 kg).
- Motorized stage range: 10 x 10 cm, focusing range: 10 cm.
- Rotary (360°) or flat version of the device.
- 8-segmented ring LED illuminator, laser autofocus.
- The device is fully controllable via software and a joystick.

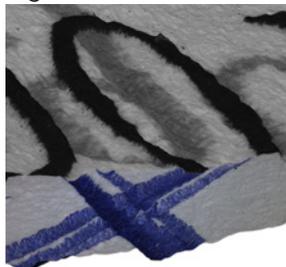


Detail of toolmarks on the surface of the cylinder lock.
Scanned area: 18 x 14 mm. Scan time: 1:18 min. File size: 136 MB

TOOLSCAN WITH COLOR IMAGING

A 5 MP color CMOS camera can be integrated into ToolScan to enable color surface visualization. This feature is particularly beneficial for applications such as:

- **Archaeology** – identify material differences and surface details with greater clarity.
- **Document Examination** – detect alterations, inks, and other important details.
- **Tool Mark Examination** – enhance the analysis of tool marks by color differentiation.
- **Ballistics** – examine materials penetrated by projectiles in greater detail.



Document signatures (top).
Color camera capture (bottom).



A bullet captured by a color camera.

SCANNING OF TOOLS AND TOOLMARKS

With a broad range of accessories, ToolScan can digitize various types of samples:

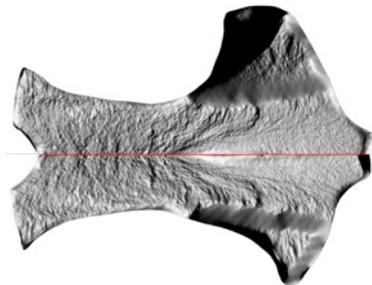
- Toolmarks – striations, imprints, cuts, casts, and physical matching.
- Tools and test samples – direct scanning of jaws, blades, cylinder locks, plier jaws, and test impressions in lead.
- Documents – signatures (line intersections).
- Archaeological samples – toolmarks on bones, ceramics, and other biological material.



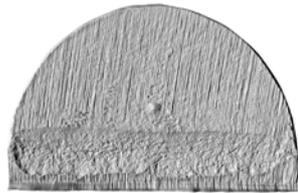
Striations, imprints on flat tools.



2D image of cut cable.



Comparison of parts of a broken drill.



Wire cut.



Coin scan.

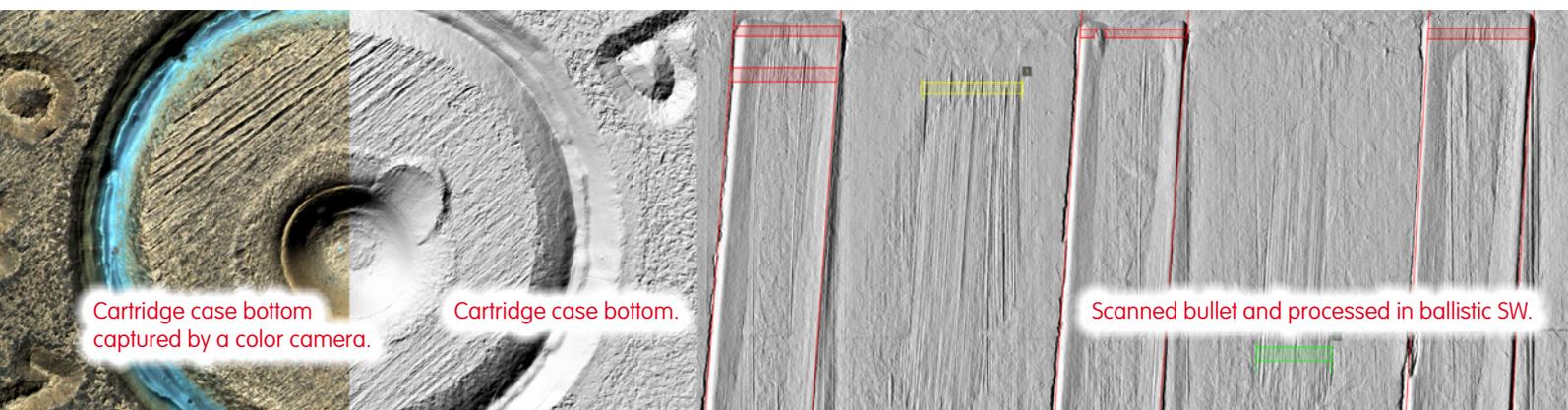


3D image of a bone showing detailed tool marks. Color camera.

BALLISTIC EXAMINATION

ToolScan can be enhanced with ballistic analysis software. This allows the system to be used for ballistic examination, providing a versatile and effective alternative to the comparison microscope.

- Cartridge Case Holder – for one cartridge case or special 16-CC holder for batch scanning.
- Rotary Motor – enables fast, precise full-surface scanning of bullets, capturing detailed markings and characteristics.



Cartridge case bottom captured by a color camera.

Cartridge case bottom.

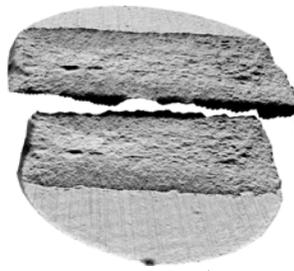
Scanned bullet and processed in ballistic SW.

VIRTUAL COMPARISON MICROSCOPY

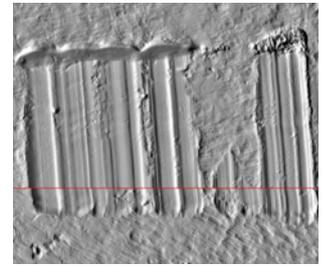
The LUCIA Forensic software offers an intuitive workflow with multiple 2D, 3D, and texture-free comparison modes:

- Split-line (including curves and polylines),
- Canvas/Tiled view (up to 16 images simultaneously),
- Transparency,
- Region and more.

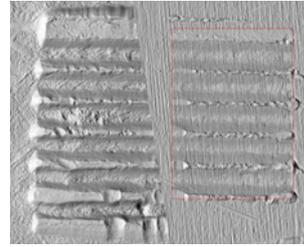
Users can adjust angle, intensity, and position of the light on scanned images. The light can also be synchronized across images, simulating the behavior of a traditional comparison microscope. Users can capture screenshots of overlapping images or perform live toolmark examinations in real time.



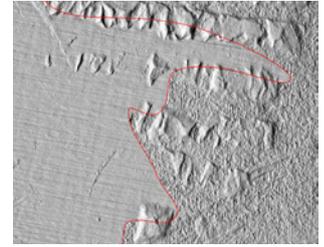
3D comparison mode Canvas of two fractures above each other.



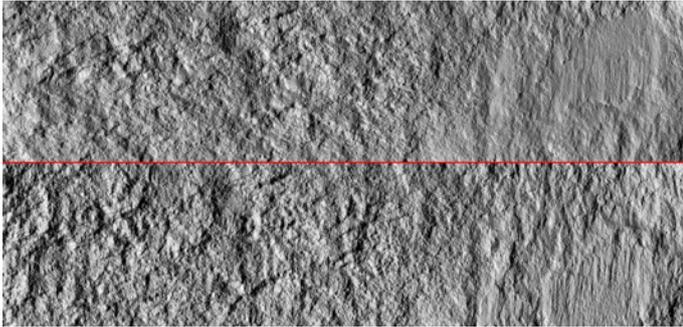
Splitted comparison of silicone castings.



An ROI used in the transparent mode to compare two impression marks.



Polyline comparison of two impression marks.

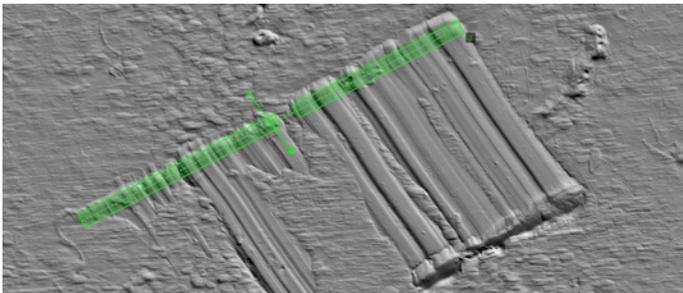


Splitted comparison of fracture areas.

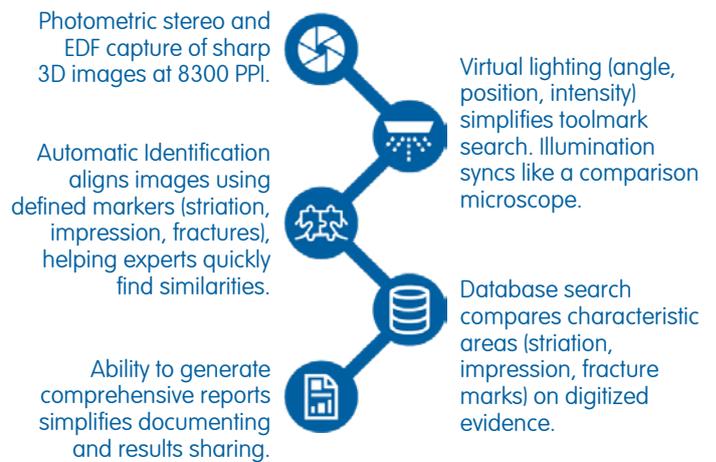
MARKING AND AUTOMATIC ALIGNMENT

Distinctive mechanoscopic features, such as striations, impressions, and fracture areas can be identified and marked on the digitized evidence.

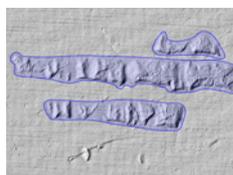
Using advanced algorithms and 3D data from defined toolmark areas, the software automatically aligns images, allowing experts to quickly identify similarities and accelerate comparisons.



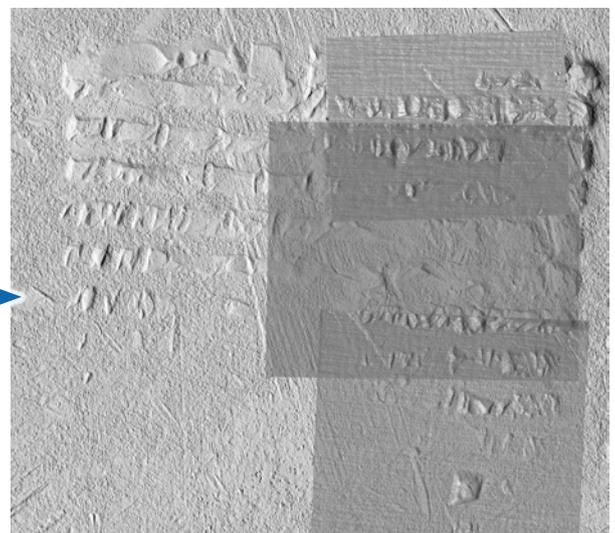
Marked striation.



Original scanned images.



Defined toolmark areas.



After automatic **Match by impression marks** the software automatically aligns images – e.g. in the Canvas mode.

SEARCH

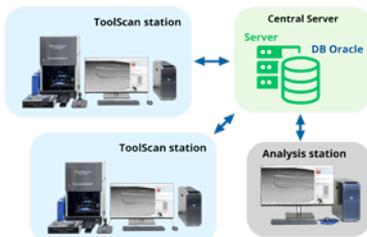
The LUCIA ToolScan software has implemented its own module for search in a database or in a folder structure on a network drive or a local disk. It uses 3D data correlation to analyze characteristic areas of the digitized evidence. This search module provides the user with a hit list of potential matches based on the correlation score.

The screenshot displays the LUCIA ToolScan software interface. On the left, a 'Hitlist' table shows search results with columns for 'Image' and 'Image count'. The table lists 13 candidates, with '4. (2505) A14-Green-A.nd2' highlighted. Below the hitlist, 'Candidate information from the database' is shown, including 'Searched image: Test-Pb-Green-A.nd2', 'Searched in: Database of 'Criminal cases'', 'Status: Finished successfully', 'Image count: 54', and 'Search duration: 00:00:07'. At the bottom, 'Database search history' is visible, showing a list of searches with columns for 'Search No.', 'Searched image', 'Searched in', 'Start Time', 'Duration', 'Image count', 'Status', and 'Hitlist'. On the right, a 'Comparison preview with similarity map' shows two side-by-side images: 'Test-Pb-Green-A.nd2' and 'A14-Green-A.nd2'. Below the images, a 'Histogram' and 'Scatter' plot show statistical data on the hit list, with the X-axis labeled 'Impression marks score' and the Y-axis labeled 'Hit score'.

Search window of LUCIA ToolScan SW for the ToolScan device.

DATABASE

The ToolScan system offers a fully customizable structure that can be designed as a solution for small laboratories or scaled into a national system with a central database connected to multiple regional databases across the country. Built on an Oracle Database, ToolScan provides administrator tools to monitor system performance and access database history, enabling users to review audit information efficiently.



Centralized solution.

CUSTOMER SUPPORT SERVICES

Our forensic specialists offer a wide range of support options to meet your needs, including the following services:

- On-site installation.
- Technical support.
- Phone and e-mail support.
- Remote connection.
- Illustrative videos, manuals, and short guides.
- Comprehensive training in our own Training Facility.
- Regular onsite maintenance, including software updates and advanced training.



EASY TEAMWORK

Four Eyes Principle

The database enables experts to consult, collaborate, and review examination results with colleagues from other laboratories. Comparison snapshots enable quick reopening of all images involved in the comparison, preserving their exact positions and views as they were at the moment of saving.

Compatibility

Compatibility with other software is guaranteed by the ability to export and import X3P format images.

REFERENCES AND COMPANY

The ToolScan system is one of the most widely used devices for toolmark experts with 140+ ToolScan devices sold worldwide.

Founded in 1991 in Prague, Laboratory Imaging s.r.o. has broad expertise in microscopy, image processing, and analysis. The company develops, produces high-quality laboratory systems for scientific, biomedical, forensic, and industrial imaging.

