



Ba/Scan

BALLISTIC IDENTIFICATION SYSTEM

BULLETS • CARTRIDGE CASES • FIREARMS



DESIGNED TO EXAMINE FIRED AMMUNITION

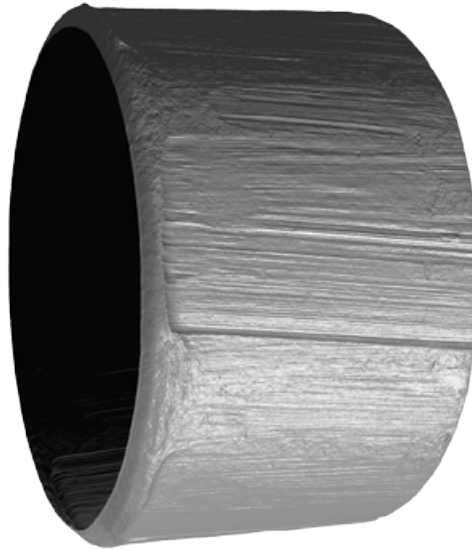
The BalScan system by Laboratory Imaging has been developed for examination and comparison of markings on fired ammunition. Cartridge cases and bullets are examined, compared, scanned in 2D or 3D, and saved to a database. A special software application searches the database and displays a hit list of possible matches. The forensic expert has a full set of comparison functions at hand to confirm the match.



Bullet holder



Cartridge case holder



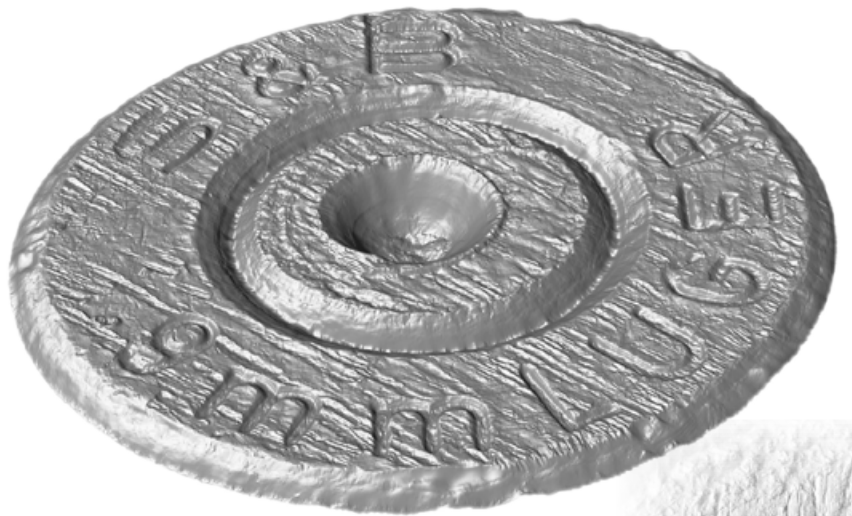
Bullet surface



Deformed bullet surface

BULLETS & CARTRIDGE CASES DIGITIZATION

Wide range of calibers can be digitized in BalScan, from small-bore rifle ammunition to 12-gauge shotgun shells. Bullets, cartridge case bottoms, or cartridge case surfaces are scanned in high 3 μ m resolution including 3D information. BalScan is very suitable for scanning and comparison of deformed bullets, bullet fragments and even direct scanning of the breech face and the firing pin of a firearm.



Cartridge case bottom



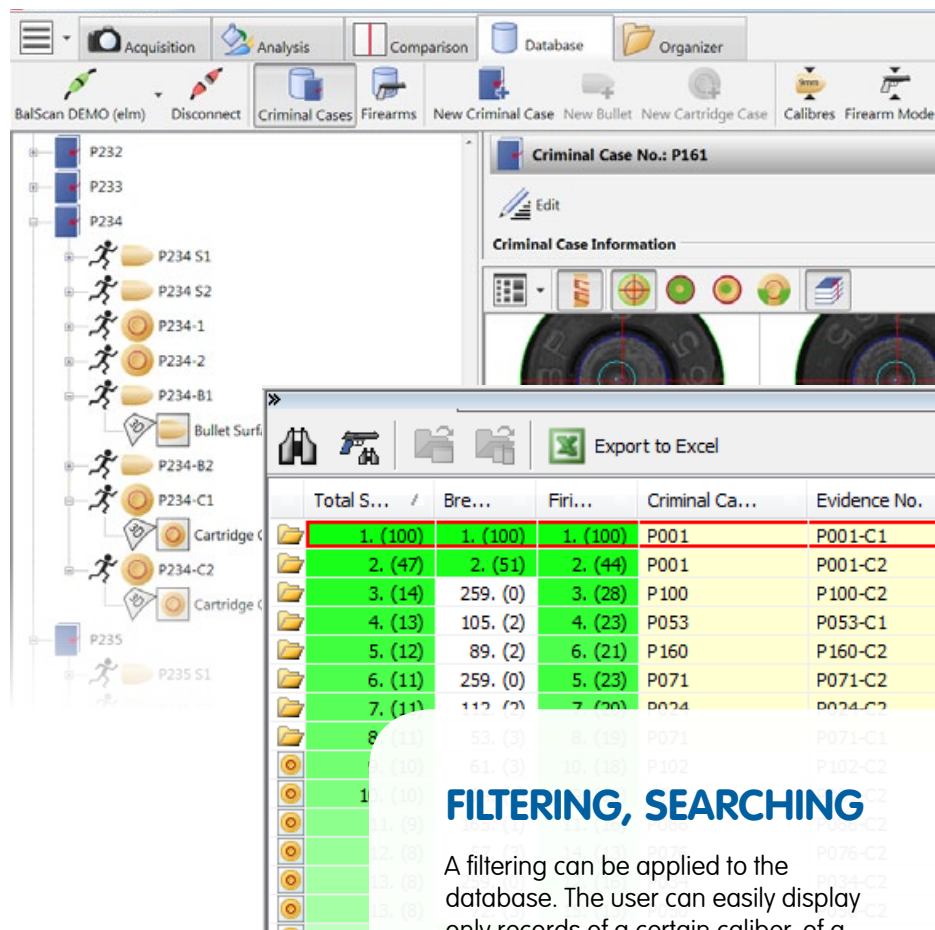
Cartridge case surface

Expanded bullet surface

DATABASE AND NETWORKING

The reliable Oracle database is an important part of the BalScan system. The database is organized in two distinct forms. The database of criminal cases contains evidences related to the crime scene along with test bullets and cartridge cases. The firearms database includes fired bullets and cartridge cases linked to a particular registered firearm.

The database can be installed on a standalone server connected to other BalScan workstations within a private network. Active workstations provide live examination, digitizing of bullets/cartridge cases, searching the database, and comparisons. Passive workstations (without the BalScan device) provide search and comparison only. A minimal setup contains just one active workstation which covers the complete functionality (digitization, database, comparisons).



FILTERING, SEARCHING

A filtering can be applied to the database. The user can easily display only records of a certain caliber, of a certain type (2D/3D/bullet/c. case), or created within a certain period of time, etc. The filtering conditions can be combined so that only relevant records are displayed.

The automatic database search is based on comparing significant areas of the digitized evidence. Land impression marks on bullets and breech face marks, firing pin marks, and ejector marks on cartridge cases are compared. Advanced algorithms and the 3D data analysis are used to achieve maximum reliability. The resulting hit list is sorted by match probability of candidates.



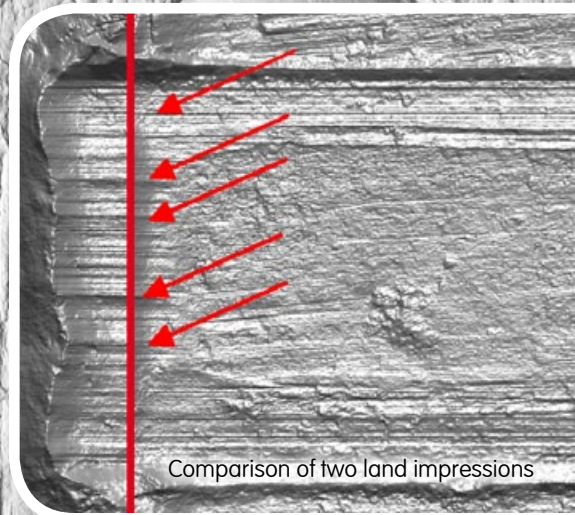
3D comparison of bullets



Annotated cartridge case bottoms

COMPARISON OF MARKINGS

There is a rich set of 2D and 3D comparison tools available with user friendly interface and intuitive image handling. The compared surfaces can be visualized texture free, highlighting the topography under any illumination direction which can be easily varied and synchronized. A breech face and a firing pin of a firearm can be directly compared with the markings on the cartridge case.



Comparison of two land impressions

DEVICE FEATURES

Acquisition Features

- Top quality monochrome digital camera (optionally color)
- Top quality telecentric lens developed specially for the BalScan device
- Precise laser focus
- Segmented circular LED illuminator, LED linear side light
- High resolution of 3 $\mu\text{m}/\text{px}$

Motorization and Control

- The device is fully controllable via the BalScan software and a programmable joystick
- Precision stepper motors are used to move the object in four axes: X, Y, Z, and rotation

Included System Accessories

- Bullet holders for calibres .177; .22; 6.35 mm Browning; 7x57 mm; 7.65 Br.; 8x57 mm; 9 mm; 9.5; .40 S&W; .45 ACP; .50 BMG
- Universal cartridge case holder – up to the size of a 12-gauge shotgun shell

SPEED AND DATA SIZE

9 mm LUGER / mono camera

	2D Acquisition	3D Acquisition
Intact bullet surface*	3:00 min ~15 MB	4:55 min ~70 MB
Cartridge case bottom	1:00 min ~15 MB	1:40 min ~35 MB
Cartridge case surface*	6:30 min ~18 MB	14:00 min ~80 MB

* full circumference, 5.9 mm width

NETWORK CONFIGURATION

Several workstations can cooperate over network. The function of each workstation in the network may vary:

Workstation purpose	Image acquisition	Search & compare	Database hosting
Active system (PC + Device)	YES	YES	YES
Passive system (PC only)	-	YES	YES
Dedicated DB Server	-	-	YES

Active BalScan-System

