Bullet comparisons using confocal microscopy

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100 microns
Confocal Microscopy

Advantages

3D representation and so theoretically invariant to specimen placement.

Disadvantages

Not really invariant for bullets because of the curved surface

Low signal to noise

High resolution instrument, the examiner uses 4X to 6X objective we have to use a 20X to 50X objective to get the same level of detail, because of the shallow depth of the striae.
Image comparison of 10 x 20x and 50x
Rotational shifts and the decrease in signal to noise
Results of the FFT filter using Mountains Map at 50x and 20x
FFT on rotational images

$0^\circ$

$3^\circ$

$5^\circ$

$10^\circ$
Raw data from the NIST un-etched standard bullet TDC
The un-etched data after leveling and FFT filtering
Final filtered profile
Raw data from the land impression of a fired bullet
Processed data from the land impression of a fired bullet
After form removal
After FFT filtering
Three land impressions from successive firings