

## Letter to the Editor: Ballistic Microstamping – Has Our Prayer Really Been Answered?

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### ABSTRACT

*Gun control laws have yielded all kinds of technical measures to help uphold them, microstamping being one of them. While the technical aspects of microstamping and the ability to microstamp cartridge cases have been studied before, no one has tried to learn whether it can actually lower crime rates, prevent crime or whether it can be bypassed. In this paper, some of the weak points of this technology will be examined and it will be shown that it is not likely to deliver the "magic" solution that people expect.*

### Introduction

In recent years, firearms examiners have aspired to find ways to connect cartridge cases and bullets to firearms, and in turn, to their owners.

As long as the work was done manually, it was possible only in countries in which the numbers of firearms were very low and the laws allowed the police, or other law enforcement agencies, to collect samples of cartridge cases and bullets from firearms before they were sold to private owners.

But in countries like the USA, with 300 million firearms, or even Israel, with only 300,000 privately owned weapons (not including those of the army and police), such an undertaking would not be possible.

However, the introductions of automatic comparison systems, such as the IBIS, have made this possible, and some countries have tried to implement techniques that will make the weapon-to-person connection much easier.

One of these techniques is microstamping. In this technique, the manufacturer of a firearm engraves a unique set of miniature letters and digits on a firearm's firing pin, breech face or any other surface that comes into contact with cartridge cases. The idea is that these letters and digits will be "printed" on the cartridges, and when they are recovered from a crime scene, all the examiner would need to do is to identify them, then go to a database, type them out and come back with the name of the firearm owner.

While this description makes the use of microstamping for ballistic identification sound easy, in reality this work is not so simple. There are two major problems with this concept:

First, there are still problems with getting a whole, perfect

imprint of a microprint on cartridges, but for the sake of this article, we assume that this problem, which is a technical one, will be solved.

Secondly, the connection of the suspected firearm to a person is not "clear-cut", as this paper will show.

### Individual Marking in the Past

Microstamping is not the first attempt to individualize a firearm. The procedure of "John Hancocking" a weapon is known to police officers who lay a trap for criminals intending to use a gun.

During this procedure, the firing pin, breech face and sometimes, depending on the weapon's type, other areas are marked in a unique way. These markings are transferred to the cartridge(s) and thereby connect it to the firearm even it is not recovered immediately.

The downside of using the "John Hancock" procedure is that it forces the user to obtain the gun, in most cases secretly, mark it, return it to its "owner", keep samples of its cartridge cases and bullets, and hope that the investigators will be able to recover it.

In Israel, this procedure has been performed successfully on individual firearms, but when it was thought to be implemented on a large scale (tens of thousands of firearms) it was found that the resources needed for it, especially a storage room, made it prohibitive.

Microstamping is supposed to overcome some of these disadvantages, because no actual cartridge sample need be kept, only a database of gun owners on one hand, and the microstamping code of their firearms on the other.

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### What is Ballistic Microstamping?

Also known as firearm microstamping, ballistic imprinting, and ballistic engraving, it is a technology that has been developed with the aim of aiding in firearm identification. It entails the use of laser engraving to produce a microscopic marking on the tip of the firing pin and onto the breech face of a firearm. When the firearm is fired, the firing pin produces an impression of these engravings on the primer and the pressure within the cartridge case produces an impression of the breechface engravings on the cartridge case head. After the fired cartridge cases are ejected, these microscopic markings can then be recovered by police and examined by forensic experts to obtain information and trace the firearm to the registered owner.<sup>[1]</sup> (See **Figure 1**)

The technical problems with this technology were already studied and reported in previous papers,<sup>[2,3]</sup> but we can assume it is a matter of time and science to solve them. Still, if we assume for a moment that this problem has been solved, there are other problems that have not been addressed so far.

### Why Ballistic Microstamping Will not Work

Here are a few of the reasons:

1. Most law abiding people, who will be the ones to buy microstamped firearms, are not usually involved in crime. In most cases, they are involved in domestic crimes (homicide of relatives, suicide) and, of course, self-defense, and they do not hide their part in it. (With the possible exception of lying about it, but not hiding it.)

So, in these cases, microstamping will not make any difference.

2. Guns that are lost and stolen. The moment that the connection between a gun and its owner is terminated, microstamping no longer has any investigative value, or its value is very low.

3. Awareness of the fact that this identification system exists would bring owners of such guns, legal and non-legal, to file the engraving off. This kind of filing, if done properly, would leave almost no markings on the firing pin or breech face. Once again, the investigative value would be close to nothing.

4. Changing of parts. Many gun users change

parts in their weapons. Moving parts, such as the firing pin, are subject to wear and need to be replaced from time to time. In this case, will the owner have to order an original part from the manufacturer? And what if he owns a foreign firearm, one that was made outside of his country, should he wait weaponless until the spare part arrives? And what about all those guns with easy access to replacement parts, for example the AR15 (M16) and their derivatives, which are so popular?

5. Drag marks. In pistols of the Colt/Browning-patent type, the up-down movement of the barrel cause drag marks on the primer. In some cases, this drag also creates a chip of metal which "covers" the firing pin mark and the micro stamp as well!

6. Clogging. The marks on the weapon are so small, they are easily clogged by metal residues, soot and dirt after few shots.

7. There is no microstamping on bullets. In many cases, all the crime scene examiners, or coroners, find at the scene (or in the body) are bullets, especially if revolvers were involved.

All the reasons above, and probably others, show that microstamping will not bring the solution that firearms examiners have been waiting for. It will only make guns more expensive to buy and to maintain. As well, it will require a lot of work to get samples from these guns, examine them and keep them. This would raise the workload of firearms examiners, whose workload is high enough already.

Legislators in different countries and states who push forward laws to impose microstamping should be confronted with the above reasons and should be asked if the whole effort is worth the trouble.

### Conclusions

Microstamping is perceived as a solution that will help to solve gun-related crimes and/or prevent them from happening, but the points brought forth in this paper and past experience with similar methods shows there are many "loop holes" in this concept, and the number of unknown crimes that would actually be solved would be very small.

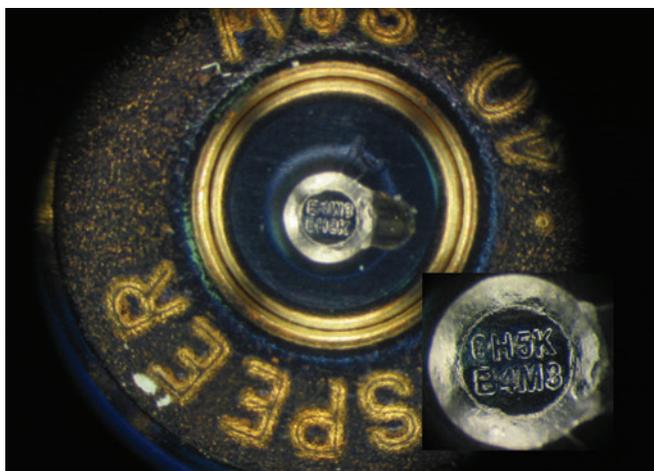
### Acknowledgement

The author would like to thank Mr. Lior Bar-On, a professional

translator and practical shooter, for reviewing the paper and for correcting any misspellings.

**References**

[1] "Firearm Microstamping", Wikipedia, [http://en.wikipedia.org/wiki/Firearm\\_microstamping](http://en.wikipedia.org/wiki/Firearm_microstamping)  
 [2] Nicholas Mattia, President, Nicholas Mattia and Associates Incorporated - "Letter to the Editor: Micro-stamping Individual Characteristics in Firearms", *AFTE Journal*, Vol. 40, No. 3, July 2008, pp 232-233.  
 [3] Chumbley, L.S., Kreiser, J., Lizotte, T., Ohar, O., Grieve, T., King, B., Eisenmann, D., "Clarity of Microstamped Identifiers as a Function of Primer Hardness and Type of Firearm Action", *AFTE Journal*, Vol. 44, No. 2, Apr. 2012, pp. 145-155.  
 [4] Image by ID Dynamics / Todd Lizotte via: [http://commons.wikimedia.org/wiki/File:8digit\\_NanoTest.jpg](http://commons.wikimedia.org/wiki/File:8digit_NanoTest.jpg) . Used under Creative Commons Attribution 2.5 Generic license: <http://creativecommons.org/licenses/by/2.5/deed.en> .



**Figure 1: Microstamping marks in firing pin impression [4]**

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**Correction from the Editor: “Proposed ‘NIST Ballistics Identification System (NBIS)’ Based on 3D Topography Measurements on Correlation Cells” by John Song, AFTE J, Vol. 45, No. 2, Spring 2013, pp. 184-194.**

Due to human error, several pre-publication revisions that were intended to be made to this article were not correctly transferred to the final manuscript that was sent to the publisher. The corrected passages appear below. The AFTE editorial staff regrets the error and apologizes to the author.

Page 189, column 1:

3. The “Contiguous Matching Cells” (CMC) Method

The “Consecutively Matching Striae” (CMS) method, first proposed by A. Biasotti [14,15], and then described by Biasotti and J. Murdock in 1984 [16], was developed into a quantitative criteria for both 2D and 3D striated toolmarks by these same authors in 1997 [17]. This CMS criterion has been used by some firearm and toolmark examiners since 1997. Based on the proposed 3D topography measurement of correlation cells, the “Contiguous Matching Cells” (CMC) criterion is proposed for potential use in the identification of both 2D and 3D signatures of bullets, toolmarks, and cartridge cases [1].

Page 189, column 1, last sentence before section 3.1:  
 The terms matching and non-matching are defined below.

Page 190, column 2, last sentence of first paragraph:  
 Accordingly, this is also considered to be a match.

Page 191, column 2, last bulleted point before section 6:  
 For the No-conclusion topographies (Figure 6d), align A and B at their initial registration angle  $\Theta_0$ , which is determined by the initial correlations using the large cell size. At this registration position, a smaller cell size is used for accurate topography correlation, until a result of either “Match” or “Non-match” (or maybe still a “No-conclusion”) is achieved.

**Letter from the Editor: Call for Submissions**

Submissions are continuing to be received at the slowest rate in years. If any of the membership has been waiting to write or submit a research article, case report, technical report (including reviews of books or other products), or reprints of an article, doing so as soon as practically possible would be most beneficial and appreciated. Thank you for your assistance.

Regards,  
 Cole Goater,  
 AFTE Editor