Ballistics IQ: From a Forensic Firearm and Tool Mark Examiner’s Perspective

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Introduction

The ability to give law enforcement actionable and timely investigative information to aid in a shooting incident is the ultimate benefit for a Firearms Examiner. Efficient use of time is critical in solving crimes. This is often difficult due to laboratory policy and lack of resources, such as personnel. However, with advancing technology, and a passionate group of people, a solution has been created to fill the gap and help combat gun crime. This is the driving force for the creation of Ballistics IQ (previously known as BallisticSearch™).

The purpose of this article is to explain this service or “solution” from a Firearms Examiner’s perspective. The two authors of this article are Senior Forensic Firearm and Tool Mark Examiners employed by Evidence IQ, with collectively more than 46 years’ experience. Edwards and Luehr are Subject Matter Experts in the field of Firearm and Tool Marks and have helped develop and sustain a gun crime solution, known as Ballistics IQ. The backbone of Ballistics IQ is the Virtual Correlation Center (VCC). The VCC is comprised of highly regarded and experienced Senior Firearm Examiners throughout the United States who are available 24/7 to review firearms related submissions from submitting agencies utilizing the Ballistics IQ System.

Ballistics IQ is a powerful, cost-effective, and innovative solution designed specifically to combat gun crime and to provide law enforcement agencies both domestically and internationally with cutting edge investigative capabilities. Ballistics IQ allows a user to access software to scan fired cartridge cases/shotshells collected at a crime scene or test fired from known firearms within seconds. Cartridge cases are compared forensically to determine the number of unique firearms, possibly what type of firearm(s), which cartridge case is best suitable for entry into the National Integrated Ballistic Information (NIBIN) program, and searches for potential links between cases. The information is documented in a Crime Scene Analysis Report (CSA) or a Potential Link Report (PL).

Once the cartridge cases are imaged into the system, Ballistics IQ uses advanced scientific algorithms to provide almost immediate triage results. Ballistics IQ capabilities include the following: 1) Mobility, 2) VCC Access, 3) Timely Results, 4) Cost Effective, 5) Triage, 6) Documentation, and 7) CrimeConnect IQ.

MOBILITY is a key component for Ballistics IQ. The solution is essentially a portable capture station with a camera that acts as a microscope and has a scan time of approximately thirty seconds per cartridge case. Ballistics IQ can be deployed at a crime scene, in a vehicle, office, or laboratory setting and is linked to a laptop/computer with a USB connection and Wi-Fi access. However, if Wi-Fi is unavailable, the cartridge cases can still be scanned and uploaded at a later time to the Ballistics IQ server so a case can be generated. This portable capability is crucial in situations of mass shootings or high-profile cases where identification of the number of firearms and type of firearm is urgent in the investigation. Several law enforcement agencies have deployed Ballistics IQ in the field at crime scenes and have utilized the strength of this technology, and the expertise of the VCC, to generate actionable investigative intelligence before they return to their offices.
Another example of mobility is Ballistics IQ provides NIBIN agencies who support outside departments with forward deployment capabilities throughout a county, region, or state. Thus, a Firearms Examiner from another laboratory system can maintain custody of evidence, visualize, compare images, and make recommendations to a submitting agency without having the physical evidence transferred to the state, city, or county laboratories. A key aspect to mobility is providing remote capabilities so that minimal contact is needed between personnel to obtain actionable investigative leads for firearm related incidents necessary in these trying COVID-19 times and when agency budgets are strained. Ballistics IQ is designed specifically to work in conjunction with NIBIN and for law enforcement agencies that do not have direct NIBIN support.

VIRTUAL CORRELATION CENTER (VCC) access is the backbone of Ballistics IQ. The VCC allows an agency to have their CSA reports reviewed by remote, experienced Senior Firearms Examiners from across the country. Most agencies utilize the VCC, but if an agency employs its own Firearms Examiners then the VCC may not be necessary. Once an agency requests a CSA Report, the preliminary report can be utilized by in-house Firearms Examiners or sent to the VCC. The VCC reviews the CSA report for accuracy and searches for potential links within the Ballistics IQ database.

The team of experienced Firearms Examiners that form the VCC have over 200 years’ combined experience and have worked cases on city, state, and federal levels within their discipline. These examiners are highly respected within the forensic community. Numerous VCC examiners are certified members of the Association of Firearms and Tool Mark Examiners (AFTE), and many hold influential committee positions within AFTE and other associations. The VCC team functions as a checks and balances system for Ballistics IQ. Additionally, quality assurance checks are in place from a managerial aspect and widespread laboratory practices, procedures, and terminology within the field of Firearms and Tool Marks Identification are implemented into VCC casework.

Through the virtual comparison tool, images of the comparisons can be included with annotations and added to casework. The documentation provided by Ballistics IQ has been used in successful criminal prosecutions in court systems nationwide.

TIMELY RESULTS are a hallmark that sets Ballistics IQ apart from other solutions. Contractually, the VCC is guaranteed to have your results back within 24 hours of submission, however the average turnaround time of most cases is within 2-3 hours. On many occasions, detectives and investigators working active crime scenes are informed of Ballistics IQ results and have useful, actionable intelligence available to them before they conduct suspect interviews and interrogations. This is an essential tool for preliminary investigations while questioning witnesses and potential suspects and for developing investigative leads to solve violent crimes.
**COST EFFECTIVENESS** is often the bottom line in most government agencies’ budgets. The cost of the solution is intentionally and strategically priced to provide an affordable service for the smaller and mid-sized agencies that need assistance with shooting incidents.

**TRIAGE** is an incredibly important step in investigating a shooting incident. Crime scene triage includes determining what an investigator immediately needs to know when he/she arrives at a shooting crime scene: How many shots fired? How many guns are involved? Can it be determined what types of firearms were used at the scene? How many shooters are we looking for? Is this case linked to another shooting incident?

A critical aspect of this system is the level of triage documentation provided on the CSA Report. After a case has been triaged by Ballistics IQ, the best image (cartridge case) for each firearm group is identified for entry into the NIBIN program. Having cases triaged by Ballistics IQ prior to laboratory submission allows a Firearms Examiner or Technician to devote their time and energy to other duties and reduces the number cartridge cases that needs to be triaged and identifies links between shootings incidents. Additionally, external agencies that are submitting evidence into the NIBIN program are often limited on how many items of evidence or number of cartridge cases they can submit per week or month. With Ballistics IQ the number of cartridge cases submitted are greatly reduced since a representative cartridge case has already been identified.

The ability to rapidly link separate shooting incidents could lead to a suspect being identified quickly, which may prevent further criminal activity.

**DOCUMENTATION** is a vital part to forensic case work. The 2009 National Academy of Science Report, *Strengthening Forensic Science in the United States: A Path Forward* and the 2016 President’s Council of Advisors on Science and Technology (PCAST) Report on Forensic Science in the Courts, and various court cases have restricted firearms testimony due lack of documentation. Increasing firearms case work documentation is essential to the credibility of the field of Firearm and Tool Mark Identification. Currently, most firearms units and laboratories do not have a detailed documented triage system. However, in the times of increased scrutiny in forensics, especially in pattern recognition disciplines, Ballistics IQ provides quality and concise documentation of cartridge casing triage, NIBIN selection, and potential link information.

Additionally, due to time restrictions and procedures, most laboratories do not photograph every item of evidence. Ballistics IQ provides an image and meta-data for every cartridge case scanned into the system. This capability reduces time spent by laboratory personnel to document or photograph the firearms evidence, as this function has been performed by Ballistics IQ. For firearm units and laboratories that are not mandated by law to be accredited by a third-party international company, such as ANAB, that sets standards for laboratory practice and case work, the detailed documentation that Ballistics IQ provides can be utilized in case notes for criminal proceedings. The reports can be used as worksheets that include scans/photography, detailed class characteristics, and case information for all items of evidenced submitted through Ballistics IQ.

**CrimeConnect IQ** is a lead generation investigative tool that specifically aids with pattern-based investigations (robbery, burglary, narcotics, gangs, firearms violence, etc.). CrimeConnect IQ is a companion solution that is integrated with an agency’s Report Management System (RMS) and is a
A comprehensive system that incorporates laboratory and forensic data, and firearms information to include National Integrated Ballistics Information Network (NIBIN), Ballistics IQ, and E-Trace reports, as well as other products. This new lead generating solution provides the ability for information to be automatically uploaded from Ballistics IQ and plotted geographically on CrimeConnect IQ. This gives detectives, investigators, and crime analysts never-before-seen experiences in search capabilities. CrimeConnect IQ can be integrated with other third-party data sources such as License Plate Readers (LPR) and Facial Recognition Software and provides the ability to upload NIBIN data as well.

FINAL NOTES

Since the release of Ballistics IQ in August 2019, the VCC has reviewed: 1940 CSA Reports, found 182 Potential Links, identified 2658 unique firearms, and reviewed 10,996 fired cartridge cases/shotshells from agencies and is steadily climbing. Ultimately, agencies that use Ballistics IQ are generating actionable investigative leads quickly that results in solving firearms related crimes, which make their communities safer by getting shooters off the streets.

As Firearm Examiners, we regret Ballistics IQ was not created sooner and available in our arsenal of tools available while working cases. Ballistics IQ is a must have for any size agency, regardless of having an on-site Firearms Laboratory and/or NIBIN system. Ballistics IQ can work with any situation and provides invaluable documentation, triage, and investigative information. We highly recommend those that are in need or even curious to contact Rocky or Stephanie or visit https://evidenceiq.com/ to request a demo and join the Ballistics IQ Team.