

nistc Enhancing Laboratory Efficiency Through Field Testing Kevin Lothridge, Chief Executive Officer; David Epstein*, Chief Operating Officer; Kirk Grates, Physical Scientist; Robert O'Brien, Physical Scientist

Abstract

Through this poster, laboratory decision-makers will understand the process and potential benefits of incorporating field testing into their agency's operations. The following key factors of a field-testing initiative are presented:

- Identification, support and procurement of appropriate fieldportable instrumentation
- Positioning of the laboratory staff as reachback experts and evaluators for these tools
- Use of training and quality assurance protocols to ensure end-user
- Establishment of Return on Investment (ROI) criteria to review annually for continual improvements
- The processes and resource issues that support this type of

Law enforcement and forensic laboratories are increasingly called to meet new challenges such as narco-terrorism, terrorist threats, synthetic drugs and more, and the need for rapid analysis of forens. evidence is ever increasing. To provide field personnel with the forensic intelligence to conduct investigations, forward-thinking agencies are equipping law enforcement with portable forensic analysis tools. These technologies allow presumptive analyses to be conducted outside the conventional laboratory environment to expedite identification of unknown compounds. This capability not only serves to expedite development of intelligence to lead the investigation, but can dramatically reduce the volume of evidence submitted to already backlogged laboratories.

Providing practitioners with deployable technologies is only one part of the solution. Ensuring practitioners also have the training and support to properly apply these tools to collect, preserve and conduct routine analysis is paramount. By utilizing proper protocols, practitioners can perform simple tests while maintaining the integrity of the evidence for follow-up laboratory analysis as needed.

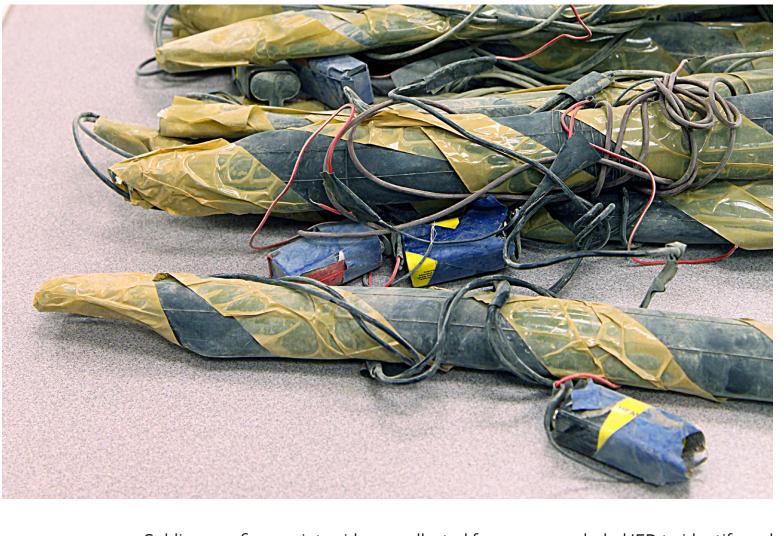
Forward-thinking agencies are equipping law enforcement with portable analysis tools to provide timely intelligence & reduce the burden on forensic laboratories.

Mission space

The groups that use forensic technology traverse many theaters of operation, but the requirements and the desired outcomes are the same: develop forensic intelligence in order to make decisions that protect the homeland and support the criminal justice system.

Department of Defense

- Identify friend or foe on the battlefield
- Identify and communicate threats to U.S. security
- Prevent terrorist activities through identification and apprehension of suspects
- Protect U.S. interests abroad, including those representing the U.S. in official capacities



Soldiers use fingerprint evidence collected from an unexploded IED to identify and apprehend members of a terrorist organization attempting to gain access to the U.S. via illegal border crossing from Mexico.

Department of Homeland Security

- Control the flow of undocumented immigrants
- Identify potential threats to U.S. security at the borders
- Identify and seize illegal or dangerous international cargo at U.S.
- Identify and prevent international criminals/fugitives from entering



Border patrol agents intercept a terror suspect attempting to enter the U.S. The agents identify and confiscate an explosive compound being transported by the suspect that could be used against targets inside the country.

Practitioners can perform simple tests while maintaining the integrity of the evidence for follow-up analysis as needed.

has assisted agencies in this effort by evaluating available and emerging forensic technologies, developing programs of instruction and providing reachback assistance. NFSTC was instrumental in developing the successful Field Investigation Drug Officer (FIDO) program that has yielded remarkable efficiencies for agencies that have implemented this process for field-testing of controlled substances.

The National Forensic Science Technology Center (NFSTC)

Department of Justice (Criminal Justice, Domestic)

- Gather timely crime scene information to support the criminal justice
- Implement predictive policing—using forensic intelligence to prevent
- Identify and prevent domestic threats to U.S. security

Police officers identify and seize narcotics intended for large-scale distribution in the U.S. found in the possession of an individual in the country illegally with alleged ties to an extremist group.

Laboratory identifies appropriate field-portable tools

The first step of developing a successful field-testing program is to bring together laboratory staff and investigators to discuss opportunities for presumptive testing of evidence. Numerous portable forensic tools exist; the devices listed below provide a few examples that might be considered for deployment.



Griffin™ 460 GC/MS

The Griffin[™] 460 gas chromatography mass spectrometry (GC/MS) chemical analyzer is used to analyze and identify forensically relevant chemical compounds in the field including drugs, ignitable liquids and explosive percursors. This device, typically found in the laboratory due to its size and power source, has been optimized and ruggedized for field use.

Thermo Scientific FirstDefender®

This portable, handheld Raman spectrometer is used to rapidly identify unknown solid and liquid chemical substances, including forensically relevant materials such as controlled substances and ignitable liquids. Raman technology measures the inelastic scattering of monochromatic light, usually from a laser in the visible, near-infrared, or near-ultraviolet range.

Thermo Scientific TruDefender® FT

The TruDefender FT is a portable handheld instrument that performs chemical characterization of unknown compounds using infrared spectroscopy.

Field-Presumptive Narcotic Screening Tests

These single-use test ampoules use colorimetric technology to screen substances for the presence of classes of narcotics. Each test kit contains a proprietary reagentgranulate (liquid and crystals) and a band of color to indicate a positive result. The tests are optimized for field use and allow law enforcement officers to presumptively test for narcotics including cocaine and crack cocaine, heroin and methamphetamine.

Cross Match® Technologies Secure Electronic Enrollment Kit (SEEK II)

The SEEK II provides wireless mobile iris, facial and fingerprint data capture. This device enrolls biometric data into AFIS databases for comparison against watch lists.

Field Forensics Elite™ 100 Explosive Residue Test

Colorimetric kit designed for trace detection of nitrogen-based explosives. The Elite 240 model also detects peroxide-based explosives such as TATP, HMTD, and MEKP as well as chlorate mixtures.

Air Science[®] Portable Chemical Safety Hood

This tabletop safety hood provides convenient protection from hazardous vapors generated on the work surface.

Labconco CApture[™] Portable Fuming System

Allows evidence to be safely processed using cyanoacrylate (Super Glue®) fuming for development of latent print evidence.

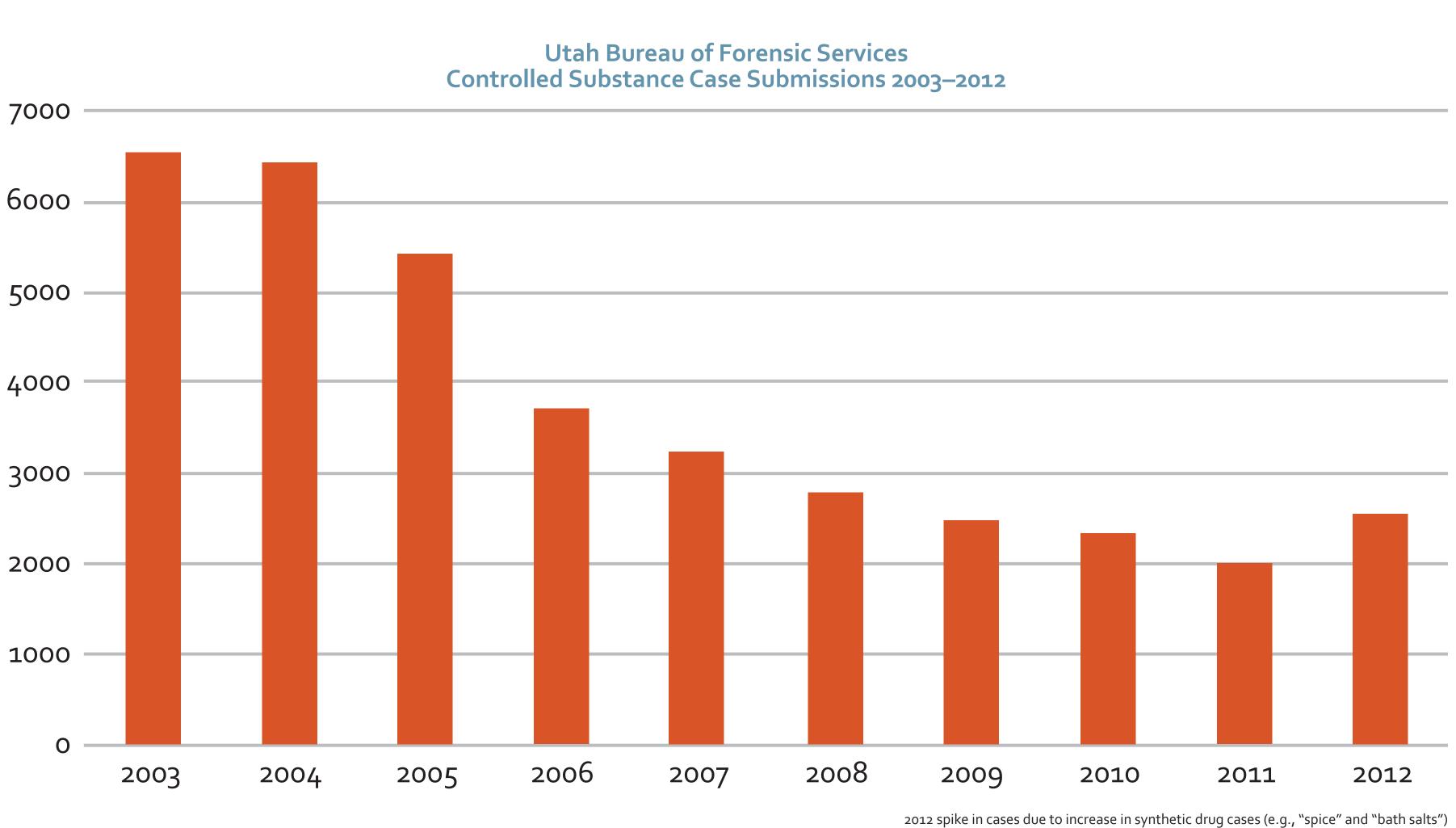
On the Horizon: Rapid DNA Analysis

Three platforms are currently available and are undergoing testing and validation. These systems can typically analyze reference samples in less than 90 minutes. The analysis capabilities vary by device. Rapid DNA devices are not meant to replace existing laboratory analysis, but could be used to narrow investigative leads and screen evidence prior to laboratory submission.

Field Investigation Drug Officer (FIDO) program

Modeled after the Phoenix PD Controlled Substances Officer Field ID program, FIDO empowers law enforcement with the resources to perform preliminary identification of commonly encountered drugs including marijuana, methamphetamine, cocaine and heroin. By empowering investigators with fieldtesting tools and training, the quantity of samples submitted to the forensic laboratory can be dramatically decreased since drug cases are often handled via plea bargain and do not proceed to a criminal trial.

FIDO Outcomes



Laboratory provides operator training and reachback support

Providing training and support to investigators is essential. Leveraging lab staff expertise to train operators ensures proper evidence collection and handling; providing support to field investigators with interpretation and maintenance issues helps ensure smooth workflow and communication.

- Training
- Evidence recognition
- Evidence collection
- Evidence preservation
- Analysis
- Maintenance and repair
- Support
- Data interpretation
- Troubleshooting
- Maintenance and repair recommendations

ROI criteria

ensure the program is creating desired efficiencies.

• Training

Costs

- Equipment
- Maintenance
- Staffing
- Savings
- Reduction in caseload & sample submissions
- Reduction in salary costs (or reassignment of FTE)
- Decreased supply costs
- Decreased maintenance costs

Agencies often employ inexpensive colorimetric tests to conduct presumptive testing in the field; however, more advanced tools such as the Griffin[™] 460 transportable gas chromatograph/mass spectrometer have been employed as well.

2012 spike in cases due to increase in synthetic drug cases (e.g., "spice" and "bath salts")

Cases reduced 61%; 2 FTE reassigned to other units.

To calculate return on investment for a field testing program, the costs to implement the program should be compared to the savings that are realized. The criteria below should be monitored on a regular basis to

Benefits

By adjusting processes and policies to support the field-testing of evidence, laboratories can reap numerous benefits, including:

- Collection of better/more appropriate samples
- Decrease laboratory turnaround time
- Reduce time spent on simple possession cases
- Focus resources on complex cases
- Reduce evidence storage, reception and release activities
- Assign FTE to other areas
- Improve customer satisfaction
- Improve staff morale

References

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Study Contact and Author Affiliations

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