F22 Forensic Field Testing: Curse or Cure?

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After attending this presentation, attendees will be aware of both the value and potential pitfalls of field tests in the forensic context.

This presentation will impact the forensic science community by bringing to the surface the various potential issues involved with forensic field tests.

Field testing of evidentiary materials is not a new concept. From the beginning stages of the first scientifically driven examinations, investigators have sought methods to rapidly and reliably extract information from materials encountered in the field. For the most part, such testing has been regarded as presumptive in nature and generally required confirmation through more elaborate laboratory testing in a controlled environment.

Examples of such testing has included simple oxidative tests for the presumptive indication of blood (e.g., o-tolidine, Kastle-Meyer, luminol, etc.), wet chemical field test kits for the presumptive indication of controlled substances, and canine detection of ignitable liquid residues. Technological and engineering advances have now enabled the miniaturization of powerful instrumental analysis techniques to the point that it is possible to carry such instruments to a scene with little effort.

At this point in time, there are various manufacturers of field-portable Fourier Transform Infrared (FTIR) spectrometers, Raman spectrometers, and gas chromatographs with various detectors including mass spectrometers. Such instruments are often equipped with extensive data libraries that provide a best hit to the operator. In the not-too-distant past, the only place that such instrumentation with their accompanying libraries could be found was in an analytical laboratory where they were operated, for the most part, by individuals with in-depth scientific backgrounds under stringent operating protocols.

As these instruments have become smaller and easier to produce, their price points have dropped accordingly. It is now economically feasible for both large and small well-funded law enforcement and first responder entities to purchase and distribute such instrumentation for use. When combined with delays in laboratory analysis due to backlogs, it should be no surprise that there is a growing push to place such powerful instrumentation into the hands of the masses.

Although issues with the various forms of field tests are not new (there are still many issues with the older forms of field testing), the deployment of such powerful technologies appears to be outpacing the ability of the field to fully evaluate the impact that such technology might have. This should be a concern that raises several issues/questions including: (1) the fact that conflicts which have arisen in the past with the older technologies have not yet been fully addressed; (2) are the people that will be using such instrumentation qualified to make conclusions based on the findings they are receiving; and, (3) are any quality measures comparable to those expected in the laboratory being employed to validate and ensure proper operation at the point of use?

This presentation will discuss the various merits and potential pitfalls of the different techniques available for use in the field from a historical perspective. Parallels will be drawn between the measures that are taken in the laboratory compared to those that should be taken in the field. Although this presentation may lean toward a cautious approach for the implementation of these newer technologies, the primary purpose is to create awareness of some of the pros and cons of these approaches. In order to illustrate some of the points that are discussed, specific examples from both the literature and from real-life experience will be presented.

Field Tests, Chemical Tests, Field Portable Instrumentation