



TracER

Portable, Compact Forensic Laser System

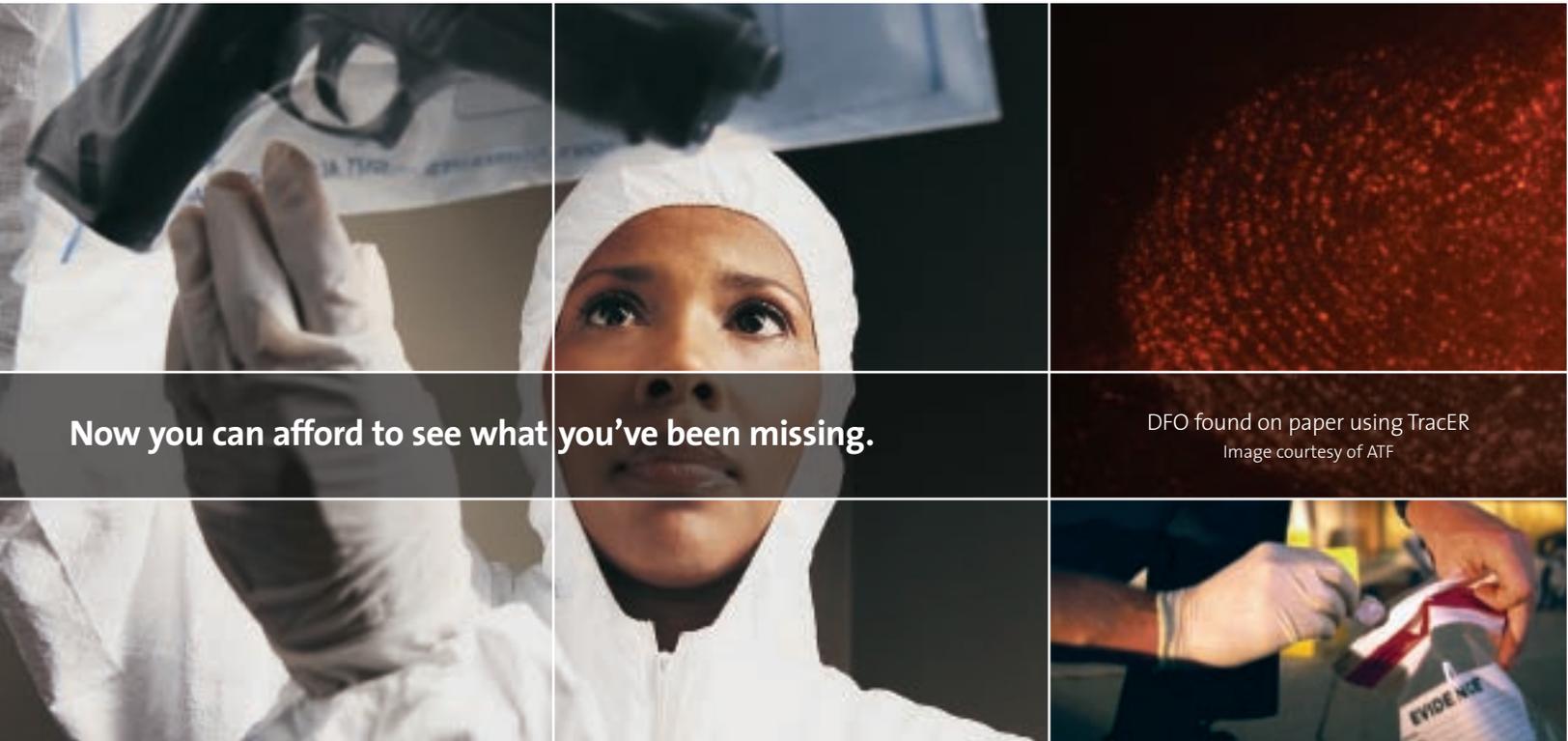
Your Reliable Source for Evidence Recovery

A close-up photograph of a fingerprint on a textured surface. The fingerprint is illuminated by a bright green laser light, which highlights the ridges and valleys of the skin. The background is dark, making the green light and the fingerprint stand out.

Superior Reliability & Performance

“Coherent's TracER forensic laser illuminates evidence details not easily seen by other means. The result is an incredible high-contrast image that clearly shows the fluorescing evidence. I have never seen a more powerful light source in operation.”

—David Spraggs, City of Boulder PD, *Police Magazine*, February 2008



Now you can afford to see what you've been missing.

DFO found on paper using TracER
Image courtesy of ATF

- Compact, portable, modular color, laser system
- Long-life battery or AC mains operation
- Superior sensitivity compared to alternative light sources (ALS)
- Cost-effective architecture
- OPSL technology for solid-state reliability, longevity and wavelength flexibility
- Optimum wavelength for common dyes
 - Green (532 nm) 6W & 8W
 - Yellow (577 nm) 3W & 5W
 - Blue (460 nm) 2W

Why lasers?

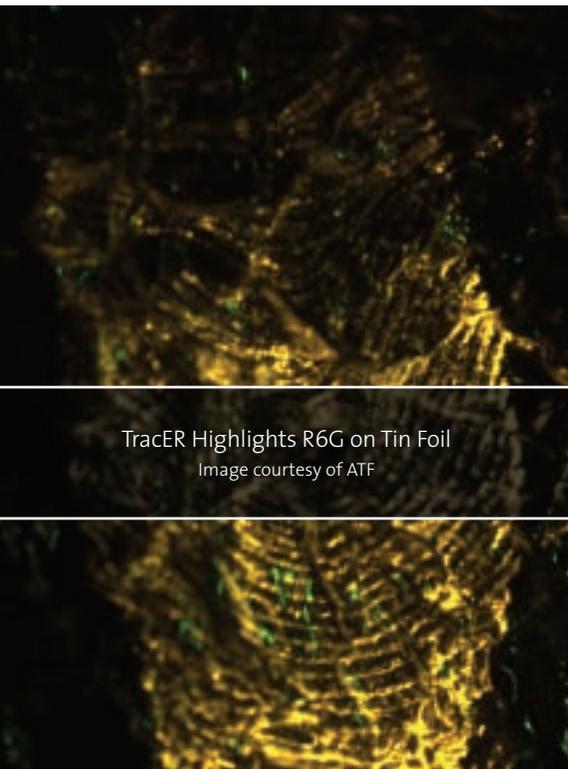
The laser has long been recognized as the optimum light source for latent evidence detection, particularly of fingerprints, and also for bone fragments, skin, and traces of bodily fluids. This view is widely held throughout criminology—by academics, expert witnesses, crime lab technicians, and crime scene investigators. The laser's undisputed superiority is a result of several unique properties that cannot be matched by lamp-based systems. The most important of these properties is spectral brightness.

Brightness.

The main purpose of a forensic light source is to excite fluorescence in tiny or trace amounts of evidence, allowing it to be seen and photographed in situations where it is not visible in ambient light or with conventional dusting techniques. This excitation may involve inherent fluorescence and/or treatment with fluorescence dyes such as ninhydrin, DFO or rhodamine 6G. With fluorescence, light is absorbed in one wavelength band (color) and re-emitted in a longer wavelength band.

Fluorescence is actually a fairly weak effect, but it works very well if the light source is powerful and confined solely to the narrow wavelength range that is absorbed by the evidence. Blocking filters in goggles or in front of a camera then allow only the longer wavelength fluorescence band to be seen, with no background. If the light source itself does not generate any light in this viewing band, then very high contrast images are possible, even for trace amounts of evidence.

Thus, fluorescence requires a powerful light source with output only in a narrow wavelength band. Scientists call this “spectral brightness.” The spectral brightness of a laser is many orders of magnitude greater than any lamp source. An ALS, or alternative light source, can be used by incorporating an optical filter, but this just dissipates most of the lamp output, leaving only a small amount of power in the target wavelength window. That is why a few watts of laser light can be much more effective than a lamp system rated at 100s of watts. Basically, higher brightness equates to better detection sensitivity.

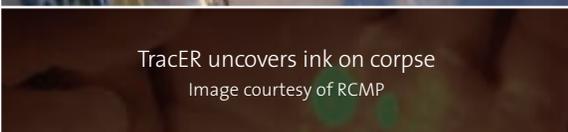


TracER – Trace Evidence Recovery

The TracER™ is a fully hand-portable, modular color, laser-based system designed and performance-optimized to be the ultimate tool for trace evidence detection, particularly of latent finger prints and other trace evidence such as bone fragments, hair fibers and fluids. It is a highly cost-effective laser source for use in crime labs and at crime scenes, as well as for covert and security applications.

“The battery option for the TracER system has proven to be extremely useful at a number of crime scenes.”

—The Forensic Science Service, United Kingdom



TracER uncovers ink on corpse
Image courtesy of RCMP



Why solid-state lasers?

The argon ion laser, with its blue/green output, was the first type of laser used for trace evidence detection. While offering greatly superior capabilities compared to lamps, these lasers unfortunately suffered from significant practical limitations. They were bulky, power hungry and required water cooling. Air-cooled “pseudo-portable” versions were sometimes used in forensics, but these were limited to low power output. Also, the output power of ion lasers slowly fades in a few years as their plasma tubes age.

This situation changed somewhat with the advent of diode-pumped solid-state (DPSS) lasers. These lasers were more compact and rugged than ion lasers and required less cooling. Their higher electrical efficiency allowed the use of conventional power outlets.

These lasers also offer better evidence detection than ion lasers because of their output wavelength is fixed. The argon-ion laser, as with an ALS can emit over several wavelengths simultaneously, thereby reducing the fluorescent signal. Fluorescent dyes

only absorb light in a very narrow wavelength band, and the 532 nm output of the DPSS laser is closer to the middle of this band than the 514 nm output from the argon ion laser. In addition, the DPSS laser is more intense, and produces substantially more power than the typical argon laser. As a result, the DPSS laser makes the dye fluoresce more brightly, generating a higher contrast image and making treated evidence easier to see.*

Why TracER?

The biggest obstacles to using 532 nm diode-pumped solid-state lasers has been their high cost and still relatively large size. That is where TracER offers a solution. Earlier DPSS lasers emitted light from a glass-like crystal (YAG or neodymium vanadate), but TracER utilizes the latest OPSSL (optically pumped semiconductor laser) technology. This type of technology has been pioneered by Coherent and is field-proven in long-life bioinstrumentation and display applications. Plus, the inherently rugged, long-lifetime OPS laser is also simpler to manufacture than glass crystal lasers. This results in a product with lower cost, smaller size and superior performance.

The biggest benefit of OPSSL technology, however, is the ability to produce high output power at custom wavelengths thereby providing a truly innovative technology to law enforcement. This high power provides the sensitivity to find evidence and prints you could never find with a lamp or an ion laser even under the most adverse conditions: old prints, prints on metals, and on porous materials like paper and stone.

TracER also delivers the ultimate portability. Its OPSSL technology is incredibly efficient, both electronically and optically. That is why it can be used in remote space-constrained and weight-restricted applications. We’ve taken full advantage of this efficiency by incorporating long-life laptop battery technology, for true go-anywhere portability. In fact, TracER is the most compact, portable, high-power forensic laser based system available today.

* *Fingerprint Detection with Lasers*, by E. Roland Menzel, pub. Marcel Dekker, Inc., 2nd edition, 1999.

“Having used the Coherent TracER in serious crime casework in Northern Ireland for the past six months, Forensic Science Northern Ireland considers that the TracER proved its value in the laboratory and at crime scenes. The TracER consistently finds imprints not detected by alternative light sources; up to 30% more in some cases, while enhancing weaker imprints, thus making them viable for photographic capture. Furthermore, TracER's battery system enables its use directly at scenes where mains power is absent or unsafe. TracER's capabilities, portability and ease of use have made it invaluable for light searching and photography within FSNI's Specialist Fingerprint Unit.”

—FSNI, United Kingdom

Why Coherent?

Coherent is the world's largest laser company. We have a long and successful history of supplying lasers for forensic applications, dating back to the early years of argon ion lasers. Our lasers are used by many police departments and forensic labs throughout the US and overseas, as well as by the FBI and the military.

As the world's largest laser company, Coherent also spends more on R&D than any other laser company. So with Coherent as your partner you

always have access to the latest, state-of-the-art laser technology. A laser also represents a significant capital investment, and with Coherent you can be sure you're getting a laser that will offer leading-edge performance for a long time.

When you partner with Coherent, your laser investment is backed by an experienced worldwide service and support team, too. No matter where you operate your laser, if you need our help, we'll be there.

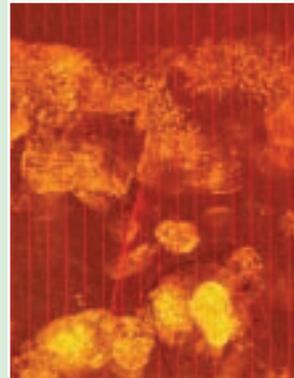


See the Advantages of TracER

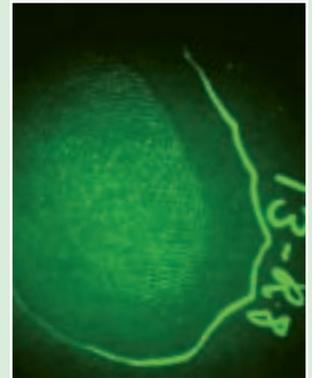
R6G on plastic
500 ms shutter time**



DFO: 56 vs. 38
identifiable impressions***

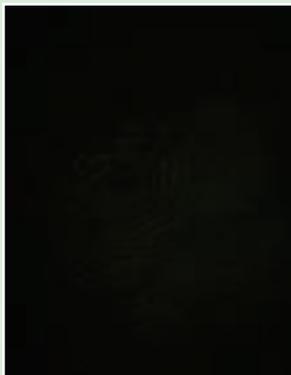


Untreated Prints on White Paper:
“Inherent Fluorescence”****



TracER

ALS



** Images courtesy of ATF, Walnut Creek

*** Images courtesy of RCMP: OIC Lower Mainland District

**** Images courtesy Brian Dalrymple (Observed with goggles and bandpass filter)