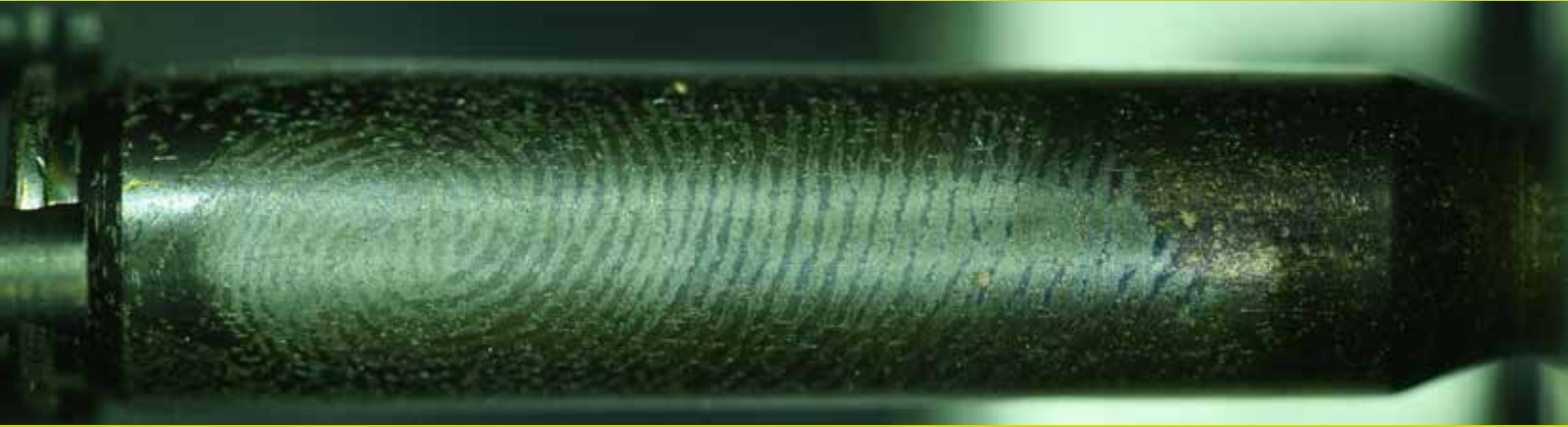


Ground-breaking Fingerprint Technology

How a chance discovery led to a new technique that would help forensic teams globally to secure convictions.



When a new method to lift fingermarks from 'impossible' surfaces was discovered, Ploughshare was responsible for selecting the right partner to ensure forensic teams worldwide would benefit from this ground-breaking technology and make it harder for criminals to evade justice.

The new method, known as the Latent Fingerprint Technique (LFT), began as a serendipitous discovery by scientists at Loughborough University in 2007. While working on an academic study in inorganic chemistry, they noticed that some glassware that had been left overnight and exposed to the process they were using had developed a fingerprint.

Aware that other academics had been investigating new techniques to develop fingerprints they realised there might be interest in this new method but were unaware at this point just how ground-breaking their discovery was.

Summary

- Reveals fingerprints on metals exposed to extreme temperatures such as fired ammunition cases as well as surfaces that have been deliberately washed.
- Licensed to Foster+Freeman in 2017
- Launched as RECOVER in October 2018
- Results can be achieved in as little as 30 minutes on average
- In use with law enforcement forensic teams worldwide

Their method used a single-stage process that could recover fingerprints from items that had previously been extremely challenging or impossible to work with. This includes items exposed to high temperatures, including Improvised Explosive Device (IED) components and fired ammunition cases, as well as metal items that had been deliberately cleaned, such as knives.

LFT therefore had the potential to revolutionise the work of forensic teams. The improvement in fingermark recovery rates it gave would enable them to obtain fingermarks from items they previously would not even have attempted to process.

A collaborate approach

The early development of LFT was a collaboration between Loughborough University, the Defence Science and Technology Laboratory (Dstl), and the Home Office Centre for Applied Science and Technology (CAST).

Loughborough University, as the developers, had the fundamental understanding of how the novel chemistry worked. CAST (now part of Dstl) brought knowledge of the fingerprint development processes used by the police and had also demonstrated success in taking laboratory concepts and turning them into equipment that could be used operationally. Finally, Dstl had an operational need to improve fingerprint recovery rates and the all-important funding to drive the development forward.

“This discovery gives us the ability to recover fingerprints from items that would have been previously difficult or impossible. It has shown particularly good results when used on fired ammunition cases, knives and contaminated metallic items”

Steve Bleay
Senior Forensic Scientist, Dstl

Together, over eight years, their combined efforts made the LFT technology a viable tool. It is a fantastic example of collaborative working between academia and government to develop an innovation that will help the police and security services to identify criminals and link them to their crimes.



Signing of the licence deal with Foster+Freeman

Foster+Freeman

To turn the successful laboratory demonstrator into a commercially available product, however, required the expertise of an industry partner.

Ploughshare Innovations' assessment of LFT identified it as being suitable for licensing and the process of screening potential interested parties began in 2015.

Foster+Freeman, as a leading forensic science equipment supplier to more than 150 countries, was an ideal partner to take LFT and turn it into a successful product.

Recognised for the design and manufacture of innovative new forensic instruments, Foster+Freeman had over 40-years' experience of delivering innovative technology to police and government agencies worldwide.

Operating out of a large modern production facility in Evesham, the company invests heavily in R&D and employs many industry experts who are able to guide and advise on new product development. Included amongst these experts is Dr Roberto King, a former researcher at Loughborough University who had previously played an instrumental part in the initial discovery of the LFT technique.

The combination of Dr King's first-hand knowledge of the LFT technique, and Foster+Freeman's track record of manufacturing industry-leading forensic science instruments, made the company an ideal commercialisation partner.

RECOVER Product development

In the months following the licence deal, Foster+Freeman moved quickly to identify the areas to be fine-tuned in order to create a commercially viable product.

The original system that was used during the discovery and initial testing of the LFT technique involved a complicated collection of chemistry laboratory equipment which was unsuitable for deployment as a commercial product.

Foster+Freeman recognised that if the system was to appeal to operational forensic laboratories worldwide, the final system would need to integrate all the required components into a single unit. Ideally, it would also provide a simple semi-automated process capable of achieving regular and repeatable results.

The final product, called RECOVER, was launched just 18 months after the licence deal and the technology transfer pack were completed. It is available through a network of 100+ global distribution partners and has already been purchased by and installed in some of the world's most prestigious forensic science facilities.

Example: Washed Items

Perhaps the most remarkable aspect of LFT is its ability to develop prints on items that have been submerged in liquids, including harsh environments such as bleach, and those that have been deliberately washed clean.

Example of fingerprints recovered from fired ammunition cases



How it works

LFT is a fuming process. A pre-cursor powder is heated and then allowed to degrade into a crystallised form in a chamber containing the object under analysis. This crystallised form is then re-evaporated, creating fumes around the object which then condense to develop fingerprints on the sample.

Unlike other techniques, LFT does not require the presence of sweat or naturally occurring skin oils to develop a fingermark. Its unique chemical vapour process reveals fingermarks that would previously have been deemed impossible, making it of immense benefit to investigators seeking to review cold case evidence.

Example: Fired Ammunition

Using traditional fingerprinting techniques, the probability of developing a usable fingermark on a fired bullet casing are so low that many forensic laboratories have abandoned the practice of examining this type of evidence altogether.

However, with LFT it is possible to develop high-quality fingermarks on fired ammunition casings as well as other items that have been subject to extreme heat, such as Improved Explosive Device (IED) fragments or items that have been burnt.

"Whether it's used on a foreign battlefield or a British crime scene, this pioneering fingerprint technology will make it much harder for criminals to escape justice."

Harriett Baldwin
former Minister for Defence Procurement

Summary

The development of LFT into a commercially available product is another example of how Ploughshare Innovations works to turn “swords into ploughshares”. It’s expert team, by assessing the technology and negotiating a license with Foster+Freeman, has ensured that the government’s investment in science and technology is maximised and that wider society also benefits by the application of its innovations.



About Ploughshare

Ploughshare Innovations is the technology transfer organisation for the Defence Science and Technology Laboratory (Dstl). It turns ‘swords into ploughshares’ by enabling businesses to gain access to defence and security technologies developed by the Ministry of Defence (MOD). Ploughshare ensures Government technology is put to good use and benefits the UK, society as a whole, and humanity by applying innovative technology to improve people’s lives. Since its creation in 2005, the company has licensed 126 technologies and attracted £140 million of investment.

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“This technology provides a major step forward in fingerprint detection and visualisation.

It gives our customers a significant increase in capability, improving detection rates, and securing convictions.”

Bob Dartnell
Managing Director, Foster+Freeman

About Foster+Freeman

Foster+Freeman are innovators in the design and manufacture of systems for the examination of questioned documents, latent fingerprints, trace evidence and shoe prints.

Established in 1978, Foster + Freeman has become one of the foremost forensic science equipment suppliers in the world, exporting market leading, and in many cases unique products to more than 150 countries.



Harnessing innovation
for a better world

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