



LATENT FINGERMARK DEVELOPMENT

VMD360



VMD560



VMD1260



Our new range of forensic VMD systems utilise the latest in advanced vacuum technology and have been designed by forensic scientists to ensure consistent and uniform latent fingermark development.

Quick & Simple Operation

The VMD range is operated via an intuitive, simple to use icon-based touch control screen. The unique control system and advanced vacuum technology provides quick and easy processing of evidence, typically in <10 minutes from start to finish.

Evidence can be safely and easily suspended or magnetically mounted on a retractable evidence holder.

Developing fingermarks using VMD has never been so simple thanks to the precise control throughout the deposition process.

The upgraded LED lighting provides excellent chamber and exhibit illumination throughout the fingermark development process.

Optimised evaporation sources allow for up to 3 metal evaporations in a single VMD process, e.g. gold + zinc + silver, resulting in rapid and uniform fingermark development.

Innovative Design

The VMD systems are self-contained for simple installation and are available in a range of models to suit customer requirements, laboratory space and budgets.

The timed start function means the systems are instantly ready to use so that evidence can be processed immediately, increasing work flow and saving valuable time.

Unlike some other forensic processes, VMD is extremely safe, with no health risk to the operator.

The systems require minimal maintenance with no need for costly filtration replacements.

New features

New features include the addition of a secure Ethernet connection, allowing system software upgrades and remote diagnostics to be carried out no matter where in the world the system is located.

The brand new VMD WiFi app allows the user to remotely monitor the status of the system from their office or another area within the laboratory.

	VMD360	VMD560	VMD1260
Overall	Height 712mm (28") Width 928mm (36.5") Depth 606mm (23.6")	Height 1892mm (74.5") Width 1132mm (44.6") Depth 717mm (28.2")	Height 1974mm (77.7") Width 1400mm (55.1") Depth 2059mm (81")
Maximum exhibit	Height 480mm (18.8") Width 285mm (11.2")	Height 800mm (31.5") Width 560mm (22")	Height 1214mm (47.8") Width 1200mm (47.2")

For more information, call **+44 (0)1454 329898**

USA sales, call toll free **+1-866-876-7303**

Email **forensics@west-technology.co.uk** or visit **www.west-technology.co.uk**

Vacuum Metal Deposition



Vacuum Metal Deposition (VMD) is one of the most powerful latent fingerprint development techniques available. The technique is widely used to develop latent fingerprints on non-porous, semi-porous and porous exhibits. Fingermarks developed using VMD are often much higher quality with excellent contrast and ridge clarity.

The standard VMD process employs the sequential vacuum deposition of a very thin layer of gold followed by a thin layer of zinc. However, in response to the introduction of more recycled and biodegradable plastics, exciting new forensic research has led to the expansion of the technique to include single metal deposition processes e.g. silver, sterling silver, copper and aluminium and new multi-metal deposition processes e.g. gold/zinc/silver or silver/zinc.

VMD has developed latent fingerprints on evidence that is over 20 years old. The technique has also provided remarkable results on exhibits that have been submerged in water or buried underground.

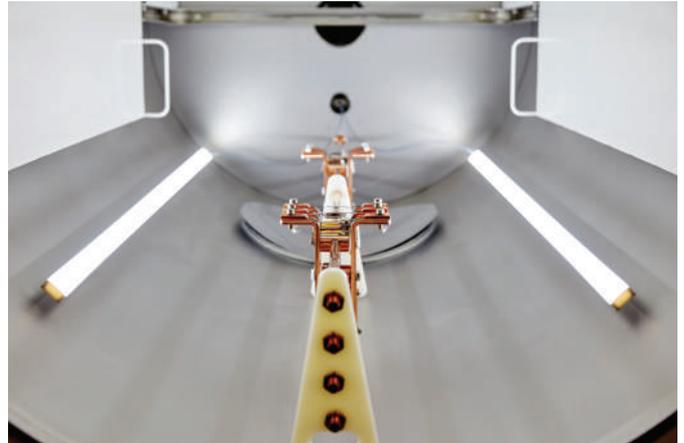
VMD is an optimal technique for a wide range of exhibits, including flexible plastic packaging, plastic bottles, glass, fabrics, firearms, glossy paper, thermal paper, polymer & paper banknotes, wood etc.

Key research has shown that VMD can develop fingermarks on tight weave fabrics. In addition VMD can identify contact areas, e.g. grab impressions, on fabrics with a loose weave, with the possible application to aid targeted DNA swabbing/extraction.

Fingermarks developed by VMD are of a much higher definition (often to 3rd level detail) and have superior contrast than marks developed using the cyanoacrylate fuming technique. The VMD process can also be used sequentially with other traditional techniques making it ideal for cold cases which have been previously processed.

The VMD technique is very rapid (typically less than 10 minutes) and produces results that can be photographed straight away. Additional to this, the standard technique is very stable, developing fingermarks that will not fade and can be imaged many days later.

A number of alternative lighting techniques have been identified as excellent ways to further enhance VMD developed fingermarks. Reflected infrared imaging and co-axial lighting have both shown to improve marks developed on complex and reflective substrates.



For more information, call **+44 (0)1454 329898**

USA sales, call toll free **+1-866-876-7303**

Email **forensics@west-technology.co.uk** or visit **www.west-technology.co.uk**

THE NEW 2018

VMD360



Since its launch in 2014, the VMD360 has attracted considerable interest as the world's first bench top forensic VMD system. For the first time, the low cost system allows even the smallest of forensic laboratories access to the highly sensitive VMD process, giving them the capability to develop fingermarks on notoriously difficult items such as fabrics and fired cartridges.

The new VMD360 is operated via an intuitive, simple to use icon based touch screen. The unique control system and advanced vacuum technology provides quick and easy processing of evidence.

Over the past 24 months our ground-breaking research and ongoing consultation with many customers worldwide has led to a number of significant product advancements to our larger VMD560 and VMD1260 systems.

From the positive customer feedback, it is clear that these advancements have taken forensic VMD to a whole new level and processing has never been easier or produced such stunning, high definition results.

We have now implemented all of these product advancements into the new generation VMD360.

The new advanced features include:

- ▶ Improved process lighting
- ▶ HD full colour touch control screen
- ▶ Easy to use icon driven controls
- ▶ Automatic zinc pressure control
- ▶ Innovative quick release evaporation sources
- ▶ WiFi app for remote system monitoring
- ▶ Improved pumping performance

The new VMD360 offers the user the option of remote monitoring of the forensic VMD process from devices such as a smart phone or tablet, thanks to the new West Technology VMD app. The app has many useful features including being able to remotely check the status of the system saving the user valuable time.



The innovative, centralised evaporation source design provides optimum deposition across the evidence holders and has a quick release clamping system to aid in easy replacement of an evaporation boat.

A new range of accessories compatible with the full VMD range is now available – including ammunition racks and bottle/can holders.

Other advanced features include upgraded LED lighting, which provides excellent chamber and exhibit illumination throughout the development process.

The addition of an extra port for such accessories as a Film Thickness Monitor (FTM) is useful for users interested in carrying out their own VMD research.

For more information, call **+44 (0)1454 329898**

USA sales, call toll free **+1-866-876-7303**

Email **forensics@west-technology.co.uk** or visit **www.west-technology.co.uk**

Fired Ammunition

Vacuum Metal Deposition (VMD) is known for its ability to develop high quality fingerprints on difficult substrates. West Technology Forensics recently undertook a 2-month research study to test VMD's capabilities to develop fingerprints on fired ammunition – a notoriously challenging exhibit to recover fingerprints from.



The recovery of fingerprints from fired ammunition has been a long-standing problem for forensic scientists worldwide. Literature and operational forensic laboratories have reported difficulty in developing sufficient ridge detail from fired cartridges, with the success rate for developing identifiable fingerprints typically <2%. The mechanism of firing creates high temperatures and abrasive friction on the surface of the cartridge, which can have a detrimental effect on any latent fingerprints present.

Ridge detail was developed on 82% of samples processed. High quality ridge detail was developed on 72% of shotgun cartridges and 65% of rifle cartridges.

The research work carried out at the West Technology Forensics laboratory aimed to determine if ridge detail could be developed from fired cartridges using the VMD technique. Alternative metal processes were tested to establish if a particular metal combination might be superior over the others.

Metal processes tested

Gold/zinc

Silver

Silver/zinc

Sterling silver

Copper/zinc

Aluminium/zinc

Fingerprints were deposited onto 12 bore fibre wadded shotgun cartridges and Winchester Super X 243 rifle cartridges. Natural and sebaceous marks were deposited onto each of the cartridge samples prior to firing.

The samples were allowed to naturally age for different time periods prior to firing.

Time (from deposition to firing)

< 5 minutes

1 hour

1 day

7 days

28 days

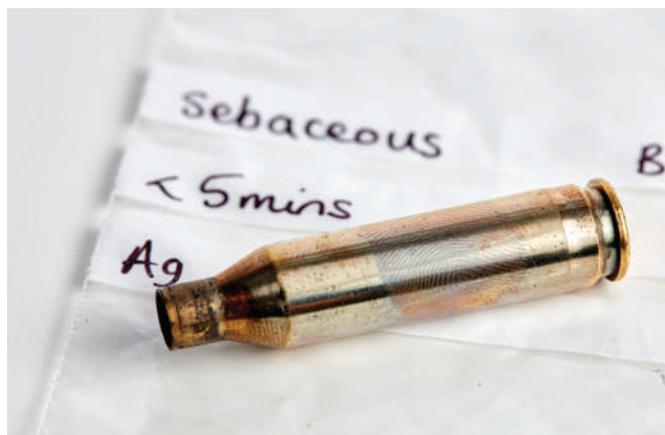
Developed marks were assessed using a grading scale similar to that used by the UK Home Office.

Grade	Description of mark
0	No obvious ridge development
1	Evidence of touch
2	Low quality or limited ridge detail
3	Moderate quality ridge detail
4	High quality ridge detail resembling fingerprint

For rifle cartridges, the silver VMD process was the most successful at developing ridge detail, with 80% of deposited marks being visualised to grade 3 or above. For sebaceous deposits, 100% of marks were developed to grade 2 or above by all metal processes tested.



Silver was the most successful metal process on rifle cartridges. No obvious deterioration in mark quality was observed for older samples.



Gold/zinc was the most successful metal process on shotgun cartridges. The quality of development increased over time for sebaceous marks.

Development on shotgun cartridges was graded in two stages due to the mix of plastic and brass material. Overall, gold/zinc was the most successful metal process, developing 80% of deposited marks. Silver, sterling silver and copper/zinc were also particularly successful at developing high quality marks on the brass material.

The aging of marks did not have a noticeable effect on the development of sebaceous marks for either ammunition type tested. Development quality reduced for natural marks after 7 days.

The results of the study show that VMD offers strong capabilities in developing identifiable ridge detail on both ammunition types, with all metal processes successfully developing both natural and sebaceous marks.

Fingermarks developed by VMD are of a much higher definition (often to 3rd level detail) and have better contrast than marks developed using other techniques. The VMD process can also be used sequentially with many other traditional techniques.

For more information, call +44 (0)1454 329898

USA sales, call toll free +1-866-876-7303

Email forensics@west-technology.co.uk or visit www.west-technology.co.uk

Fired Handgun Ammunition

Recent research carried out at West Technology Forensics' laboratory concluded that high quality ridge detail could be consistently developed from a range of fired rifle and shotgun cartridges using the forensic Vacuum Metal Deposition (VMD) process.



Our latest exciting research concentrates on fired cartridges from revolvers and semi-automatic pistols.

Visualising fingermarks on fired handgun cartridges has always been considered problematic, especially from semi-automatic pistols.

Amongst the possible reasons cited are the conditions within the chamber during firing, where the cartridge is exposed to high temperatures, excessive friction forces and the rapid expansion and contraction of the metal casing. Other possible factors include the loading of the magazine and the automatic ejection of the cartridge case after firing.

For this research, in collaboration with the UK Royal Armouries, five different revolver and semi-automatic pistol models were chosen, including a Colt M1911 and Smith & Wesson 29.

As with the previous research, fingermarks were deposited onto a range of cartridges including 357 Mag., 9mm, .44 Rem. Mag. and 45ACP.

Natural or sebaceous marks were placed onto cartridge samples and then the samples were allowed to naturally age for different time periods prior to firing.

Time Period (from placement to firing)

- < 5 minutes
- 1 hour
- 1 day
- 7 days
- 28 days

Metal Processes Tested

The previous research on fired rifle and shotgun cartridges had concluded that, of the 6 original VMD processes used, the most effective were 2 single metal and 2 multi-metal processes:

- Silver
- Sterling silver
- Gold/zinc
- Copper/zinc

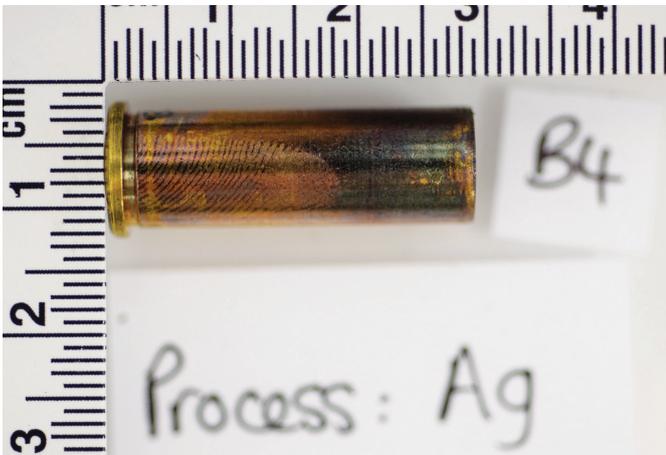
Results

The developed marks were assessed using a grading scale, as recommended by the UK Home Office.

The results of this study clearly showed that the traditional gold/zinc VMD process was the least effective for fired handgun cartridges.

The most effective VMD process was silver; however, both the copper/zinc and sterling silver VMD processes also produced excellent results.

The grades for ridge detail developed from fired revolver cartridges were higher when compared to the semi-automatic pistol cartridges and further research is required to investigate disparity. It was found that the larger calibre pistol ammunition had a greater success for fingerprint visualisation, which could be due to the larger surface area.



Ridge detail was developed on 49% of samples processed. High quality identifiable ridge detail was developed on 12% of handgun cartridges.



It was interesting that, as with the previous research on fired rifle and shotgun cartridges, the ageing of marks did not have a noticeable effect on the ability to develop ridge detail.

The overall success rates for developing and visualising ridge detail on fired handgun cartridges were reduced, when compared to the results for rifle and shotgun cartridges, however, the success rate is still much higher than the <1% cited in existing published literature for other forensic techniques.

Other added benefits of the VMD process include:

- ▶ A much higher definition of ridge detail compared to other more traditional techniques
- ▶ Quick processing of cartridges in as little as 5 minutes
- ▶ Process 50 to 100+ cartridges in a single process (system dependant)
- ▶ Does not affect subsequent DNA testing
- ▶ Extremely safe process with no filtration needed
- ▶ Low cost per run
- ▶ Used operationally by Law Enforcement worldwide
- ▶ UK Home Office - Category A fingerprint development process

For more information, call +44 (0)1454 329898

USA sales, call toll free +1-866-876-7303

Email forensics@west-technology.co.uk or visit www.west-technology.co.uk

Fabrics

Vacuum Metal Deposition (VMD) is one of the only available techniques capable of developing fingermarks on fabrics. Previous research has shown that VMD can develop ridge detail and reveal areas of touch (for subsequent DNA testing) on a range of fabrics^{1,2}. The West Technology Forensic Application Laboratory continues to carry out research & development on fabrics, including the use of alternative metal processes such as silver/zinc to improve development quality.

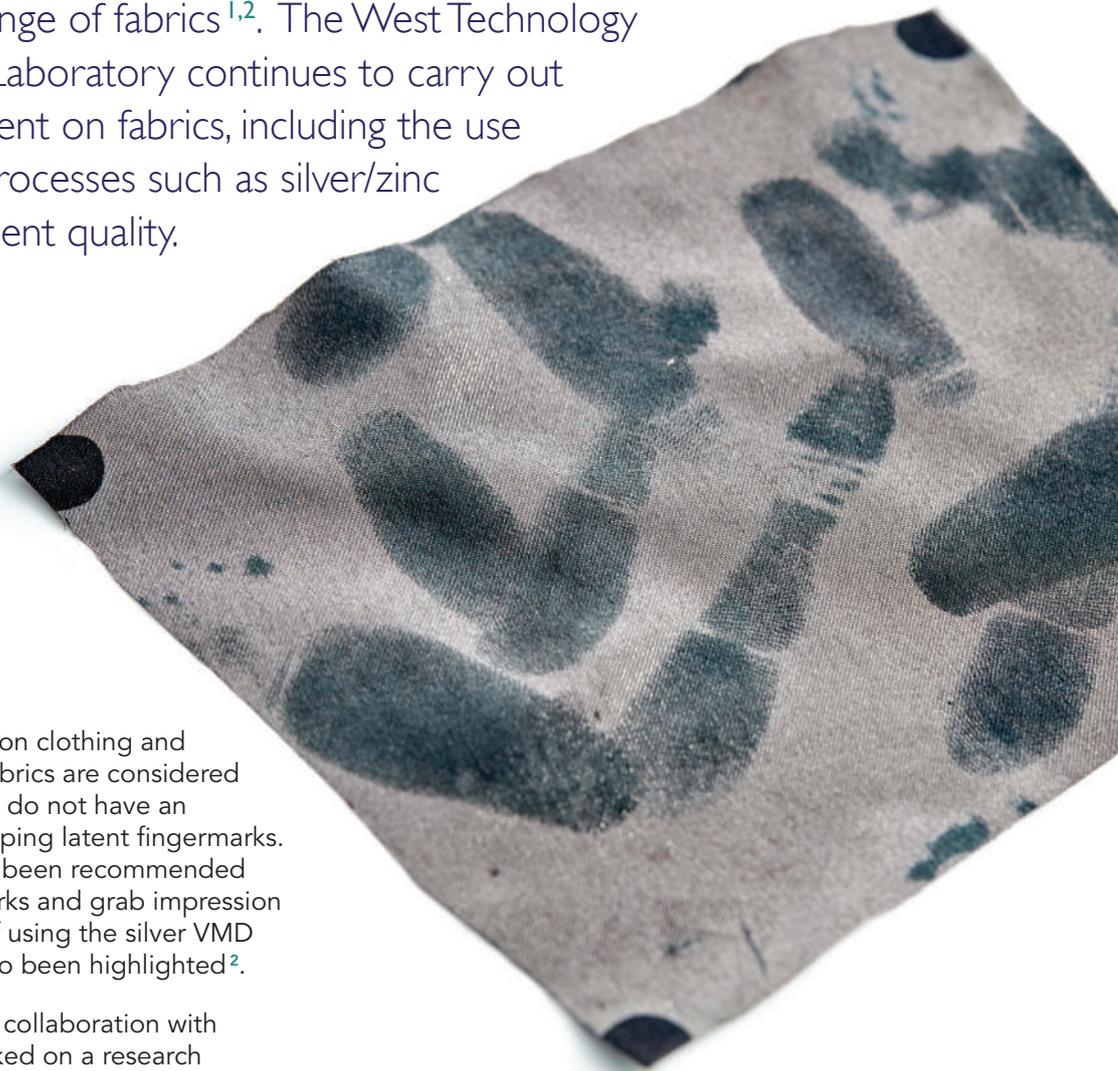
Research into the use of VMD on clothing and fabrics began in the 1970's. Fabrics are considered to be difficult substrates which do not have an established process for developing latent fingermarks. The use of gold/zinc VMD has been recommended for the acquisition of fingermarks and grab impression on fabrics¹. The advantages of using the silver VMD process on dark fabrics has also been highlighted².

West Technology Forensics, in collaboration with Abertay University, has embarked on a research project to refine the capability of VMD for developing fingermarks and general touch marks on a range of fabric types. The research aims to identify the optimal metal processes for different fabrics and will test a range of samples to include different coloured fabrics.

¹ Fraser, J. et al. (2011) Visualisation of Fingermarks and Grab Impressions on Fabrics. Part 1: Gold/Zinc Vacuum Metal Deposition. Forensic Science International. 208 (1-3), pp.74-78.

² Knighting, S. et al. (2013) Visualisation of Fingermarks and Grab Impressions on Dark Fabrics using Silver Vacuum Metal Deposition. Science & Justice: Journal of Forensic Science Society. 53 (3), pp.309-314

Gold/zinc VMD is recommended for the acquisition of fingermarks and grab impression on fabrics.



The Research

Full hand marks with naturally occurring residues are deposited on a range of fabric samples. Various metal combinations are used to process the samples and comparisons made on the quality of development.

Metal processes tested

Gold/zinc

Silver

Silver/zinc

Sterling silver

Copper/zinc

Aluminium/zinc

The samples were allowed to naturally age for different time periods prior to processing.

Time (from deposition to processing)

1 day

2 days

7 days

14 days

28 days

The VMD process can also be used sequentially with many other traditional techniques. A range of sequences will be tested to determine the optimal processing conditions for fabrics.

VMD development of touch marks could potentially help in the identification of those involved in criminal incidents through the development of ridge detail and palmar flexion creases; visualising areas that could be targeted for DNA; and helping to corroborate a sequence of events.

Research efforts will also be continued on leather fabric substrates following initial promising results using the sterling silver VMD process.

Research has shown that VMD has low interference on subsequent DNA recovery³, making it the preferred technique for mark development on clothing and other fabric evidence.



³Raymond, J. *et al.* (2004) The effect of common fingerprint detection techniques on the DNA typing of fingerprints deposited on different surfaces. *Journal of Forensic Identification*. 54, (1), pp. 22-44.

For more information, call +44 (0)1454 329898

USA sales, call toll free +1-866-876-7303

Email forensics@west-technology.co.uk or visit www.west-technology.co.uk

Thermal Paper, Train Tickets and Leather

West Technology Forensics is committed to continuous development and understanding of the Vacuum Metal Deposition (VMD) technique. Our on-going research to establish the most effective process for developing fingermarks on problematic substrates is very important to our customers. Preliminary research results have indicated that VMD has great potential to develop fingermarks on thermal paper, train tickets and leather.



The recent research and development work, by West Technology Forensics, of silver/zinc as a recognised VMD process has been applied to difficult substrates such as thermal paper, leather and train tickets and has shown excellent potential to develop high quality fingermarks. Recent feedback from our customers across the world has confirmed that VMD is a powerful technique for these substrates.

Further research will assess the sensitivity of the VMD technique and where appropriate, comparisons will be made between VMD and other fingerprint development techniques, such as ninhydrin and cyanoacrylate fuming.

Silver/zinc VMD is now the recommended process for a range of substrates including polymer banknotes, glossy plastics and train tickets.

The research will extend the initial studies on controlled sample e.g. thermal paper roll, to investigate VMD on genuine samples e.g. collected receipts to establish the optimal process for operational use.

Third level minutiae has been visualised on thermal receipt paper and train tickets using the silver/zinc VMD process.

Leather presents many challenges for fingermark development as the varying forms of leather and its textured surface make it difficult to develop high quality ridge detail suitable for identification purposes. VMD has already shown success on fabric substrates and therefore it is planned to recreate these results on a range of leather materials.

Additional in-depth research on the silver/zinc VMD process and the development of fingermarks on other difficult substrates is also planned.



For more information, call +44 (0)1454 329898

USA sales, call toll free +1-866-876-7303

Email forensics@west-technology.co.uk or visit www.west-technology.co.uk

AFTER SALES



VMD Training, Installation & Support



West Technology Forensics pride themselves on their specialist team of training instructors and installation engineers. We are dedicated to providing first class technical support for all of our customers and other VMD users, should help be required with a particular exhibit or substrate type.

West Technology Forensics is the world's leading provider of VMD systems for latent fingerprint development. We are unique in offering a comprehensive installation and training service.

Our highly experienced and knowledgeable instructors provide full training in all aspects of VMD system operation and the processes involved.

We offer individual or group training packages either at the customers premise or at West Technology's modern training facility.

A typical training course consists of the following:

- ▶ Operating procedures
- ▶ Substrate handling
- ▶ VMD processing techniques
- ▶ Substrate type and choice of VMD process
- ▶ Sequential processing – VMD and other techniques
- ▶ Preventive maintenance procedures
- ▶ Troubleshooting procedures
- ▶ The basics of high vacuum engineering

We are also happy to offer bespoke packages that are specifically formatted to suit our customers' exact needs.

Our modern, well equipped Application Laboratory is managed by Leigh Brewer, one of the world's foremost forensic scientists in VMD research.

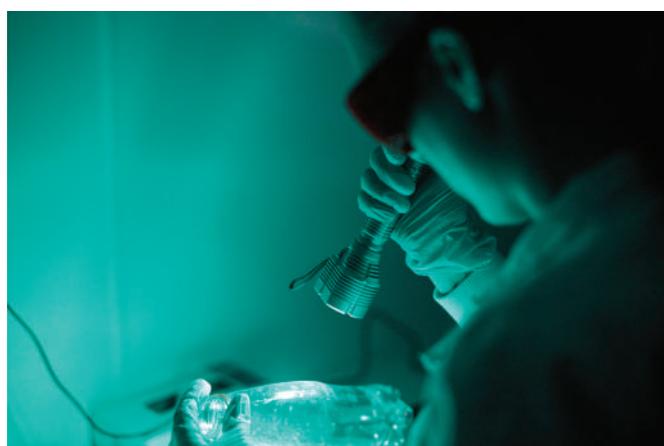
Our research program consists of in-house projects and a number of collaborative projects with world renowned forensic academic and research institutes.

We are also engaged in a rolling research program that considers all aspects of the design of our VMD systems with the aim to further improve and optimise them for use in forensic and fingerprint laboratories.

The intense nature of the demands on forensic laboratories to process exhibits rapidly and effectively is something that West Technology Forensics puts at the heart of their technical and service support policy.

We provide unrivalled technical and service support which includes:

- ▶ Secure remote support and diagnosis
- ▶ Local support in over 50+ countries worldwide
- ▶ On-going support and servicing
- ▶ Flexible service contracts
- ▶ Remote software upgrades



For more information, call **+44 (0)1454 329898**

USA sales, call toll free **+1-866-876-7303**

Email **forensics@west-technology.co.uk** or visit **www.west-technology.co.uk**