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Winsor Report: The analysis

Intelligent
Fingerprinting

Prosecuting a
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Intelligent Fingerprinting

Intelligent Fingerprinting, a new company from the University of East Anglia, have developed a unique way of detecting drug use and personal identity through the analysis of fingerprint sweat. They have produced a prototype hand-held device that will allow mobile testing of fingerprints and are currently working with the Home Office and other agencies of the criminal justice system to get approval for police use. Paul Yates, of Intelligent Fingerprinting, has written exclusively for The Billboard about the company and its ground-breaking new product.

Detection of drugs and their metabolites (by-product chemicals of the body's metabolism of ingested substances) in body fluids including blood, urine and saliva are already commonly used within police work, yet often have drawbacks including the need to collect invasive samples such as blood or urine, biohazard risks, cross reactivity with other substances in the samples, and a requirement for cold or frozen sample transport and storage. In addition to these, tests are sometimes susceptible to contamination leading to increased levels of 'false positives', or can be cheated by the person undergoing the testing procedure by substituting a sample or using a sample adulterant.

Our company, Intelligent Fingerprinting Ltd, have developed a hand-held device that allows the use of a simple fingerprint collection and analysis process whereby the samples are quick and easy to collect, have an inherent watertight chain of evidence continuity through visualisation of the sample donor's fingerprint, are stable at room temperature and, without any further sample preparation, can be tested for both identity and the metabolites of substances ingested (knowingly or unknowingly) by the sample donor. Furthermore, the unique ability of the IFP process to detect the metabolites in direct association with the individual sweat pores from within the fingerprint also means that the tests cannot



Above: Images of a fingerprint before and after testing with the Intelligent Fingerprinting technique. The colour change in the second image confirms the detection of the drug being tested for whilst at the same time maintaining a high-definition image of the fingerprint itself. (Scale bars = 5mm).

give a false positive as a result of innocent contamination, or from secondary transfer of metabolites from someone else's fingerprint as a result of a handshake or similar contact.

Intelligent Fingerprinting was formed in 2009, based on the research of Professor David Russell, Chair of the Chemistry Faculty of the University of East Anglia based in Norwich. Funding for the initial company set-up and research into the potential uses of the technique was provided by the Icení Seed Corn Fund – a fund dedicated to commercialise innovation and technological development from East Anglian academic and research organisations.

Since then the company has secured two further investments, one in 2011 to fund the production of the hand-held prototype testing device, and the second earlier this year to commercialise the hand-held device and drugs of abuse reagents for mass production.

Following receiving the Icení funding the company was also joined by Dr Jerry Walker as Chief Executive, and I joined last May after an 18 year career in the Forensic Science Service to help identify where the technique could be beneficial for use within criminal justice and other similar markets. We have also employed a small team of research scientists, and following the

recent move into our new premises on the Norwich Research Park Innovation Centre, will be adding to this team as we step up development of the device and the reagents it uses.

There are many potential uses for the Intelligent Fingerprinting technique, both within criminal justice (for example gaining intelligence from undetected latent crime scene fingerprints, or from roadside screening to assist in corroborating allegations of impaired driving), mandatory drugs screening (to support testing within Prisons or the Military, or Occupational Health Policies within safety-critical industries), or within Homeland Security (through potential identification of individuals who might have had recent contact with explosives or ammunition as part of boarding security procedures).

With regards to gaining agreement for use by the UK Police and other Home Office agencies, it is first necessary to gain 'type approval' for the device and reagents. The type approval process is managed by the Home Office Centre for Applied Science & Technology (CAST) and covers the workings and ergonomics of the device itself (to ensure that it will withstand the rigours of police use) and also the accuracy of the tests (in this case to align with the specifications already agreed by the Home Office for drug screening devices). The timeline to complete this process is difficult to estimate, as it is dependent on us providing the necessary data to CAST to be able for the Intelligent Fingerprinting technique to be considered for type approval, but realistically the earliest the device might be available for procurement by the police is during 2013.

Gaining type approval is also necessary for the device to be used by other agencies of the Home Office (for example the National Offender Management Service for the Prison Service, and the Drugs, Alcohol and Community Safety Directorate for



Prototype of the Intelligent Fingerprinting hand-held sample collection and analysis device. The use of this device will allow samples to be collected from individuals' in-situ, with results available from analysis using disposable analysis cartridges in a matter of minutes.

wider drugs testing by the Police Service). The other uses for the device for drugs testing outside of criminal justice also have regulatory requirements, but most of these will be covered by the data that we need to collate for the Home Office type approval process.

Whilst the main focus of Intelligent Fingerprinting at the current time is to develop the device and reagents for drugs of abuse, we are also trying to secure additional funding/identify partners with whom to work to explore other opportunities both at home and overseas. We have also considered that the device could be used to provide the fingerprint image for real-time comparison with police databases, and to ensure compatibility we have taken advice from companies who currently provide police communication and automated fingerprint recognition services. The result of this is that our device could be configured to work with whatever is required; i.e. it could store the images and results internally for later download, or transfer them to other police equipment or databases via wireless or other connections. The current development work to commercialise the device and reagents will look at these requirements and ensure that have flexibility within the design to cater for them.

For more information on Intelligent Fingerprinting please visit our website, www.intelligentfingerprinting.com.



Paul Yates

Dr Paul Yates, Business Development Manager, has over 17 years' experience working within the UK Criminal Justice System (CJS); firstly as an Expert Witness

Forensic Scientist for the Metropolitan Police Forensic Science Laboratory, and latterly as the Key Customer Account Manager for the Forensic Science Service (FSS) Huntingdon Laboratory. During his time there Paul was responsible for business development and account management for all police force customers within the East Anglian region, and worked with partner agencies from across the CJS to maintain and improve the forensic services provided by the FSS Huntingdon Laboratory. Paul's work included development of services to tackle major crime and sexual assault, and was recognised in 2009 through the presentation of The High Sheriff of Cambridgeshire's Award for Excellence in Forensic Science.