

Microdots technology – Addressing the issues

A South African perspective

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The key challenge facing law enforcement remains the need to improve the identification of motor vehicles. Investigations have proved that in almost all serious vehicle-related crimes and in many road traffic offences, primary and secondary identifiers (licence number, vehicle identification number (VIN), engine number and covert identifiers) have been altered or removed in order to conceal the crime and identity of the vehicle.

The high percentage of un-recovered, stolen and hijacked vehicles and the high percentage of unidentified recovered vehicles (unidentified by police and by staff of the Original Equipment Manufacturers (OEMs) prove the inadequacy of the current vehicle identification methods.

The improvement of the identification of motor vehicles is a priority of Business Against Crime South Africa and its partners. Many alternatives have been assessed. The most significant and promising alternatives were the marking of the vehicle in multiple places (multiple parts marking or 'whole of vehicle marking') by means of laser etching or by using barcode labels.

However, most of these alternatives were seen as expensive, impractical, inaccessible and ineffective. In addition, there were concerns that the fitment could damage the motor vehicles.

History in South Africa has proved that criminals only need a short period of time (less than 2 years) to acquire the necessary knowledge to be able to remove all covert markings (especially barcode labels).

During the assessments done by Business Against Crime South Africa, microdot technology has emerged as being head and shoulders above the rest in securing (preserving) the identity of the vehicle.

However, many manufacturers, importers and builders of vehicles (also referred to as OEMs) have indicated that they do not agree that microdot technology is the answer to the vehicle identification problem while others have taken the initiative and embraced the technology in one form or another.

A number of issues against the use of microdots are frequently raised. Business Against Crime South Africa is of the opinion that many of these reasons raised are not correct and are based on the misunderstanding of the concept of the microdot technology as an additional vehicle identifier.

The objective of this document is to address all pertinent issues regarding microdot technology.

Concept of microdot technology as an additional vehicle identifier

The concept of microdot technology as an additional vehicle identifier which enables whole of vehicle marking (WOVM) rests on the following important factors:

- The main function of microdots is securing the identity of the vehicle through marking the vehicle, and its parts, in multiple places with a unique identification number that will make it easier to identify recovered vehicles where the primary and secondary identifiers have been removed.
- The strength of microdots as an identification tool is in the number of dots (approximately 10 000) and the fact that dots are applied in overt and covert places (88 different positions).
- Microdots are mainly used as a forensic tool by police services to give an indication of the identity of the vehicle.
- The investigation process followed by the police when using microdots to determine the identity of a vehicle or part does not differ from the process followed when using the current VIN, engine number or covert markings.
- A motor vehicle and its parts can be marked with microdots indicating a different unique identification number other than the VIN number (i.e. can be microdotted more than once).
- Microdots do not replace the need for other security measurers (e.g. vehicle tracking, locks, alarm systems and immobiliser systems).



Issue	Response
1. The application of microdots delays the manufacturing process.	§ The application of microdots in the OEM environment does not have to form part of the manufacturing process. It is acceptable that Vehicle Identification Number (VIN) based microdots can be applied before distribution to the dealer network (e.g.

	<p>distribution centres).</p> <p>§ The off-line manual process can be done at less than 4 minutes per vehicle.</p> <p>§ The use of robotics to apply microdots can speed up the process to below 3 minutes per application.</p> <p>§ Robotics have been developed for both on and off-line application</p>
<p>2. It is expensive to mark replacement parts.</p>	<p>§ It will not be a requirement in South Africa to mark replacement or crash parts and the decision will be left to either the owner or the insurer of the vehicle. (There will be enough of the original dots left on the vehicle to identify the vehicle.)</p> <p>§ If the replacement parts are marked, it will be marked with a unique PIN (not VIN or same PIN). The required database will point to the vehicle that was fitted with the replacement part.</p>
<p>3. Problems will be experienced with the use of used parts that are microdotted. Illegitimate prosecutions will take place when a part with a different microdot is found on the vehicle.</p>	<p>§ To the contrary, the use of microdots might even protect the owner of the used part from being inconvenienced by unnecessary investigations as currently caused by the duplication of engine and part numbers.</p> <p>§ Microdots are a forensic tool. Further investigation will be required if microdots are found on a replacement part. If the part belongs to a stolen vehicle, the police will take action.</p> <p>§ The above-mentioned investigation process does not differ from the current processes followed by the police to determine the legitimacy of parts by using part or engine numbers.</p>
<p>4. Microdots can be removed with solvents, grinding it off, painting over it, etc.</p>	<p>§ The sheer number of dots and the fact that dots are applied in overt and covert places makes it impossible to remove all dots. Examples in South Africa exist where criminals have gone to extra lengths in attempting to remove the dots. In all cases undamaged dots were found without major effort.</p> <p>§ The fact that a microdotted vehicle is entered into a database will lead an investigator to look for dots, even if they are sprayed over. If a model range is known to be marked by the OEM, it is fair to assume that any vehicle in that range from a cut-off date was marked.</p>
<p>5. Dots can be forged.</p>	<p>§ Forgery is almost impossible due to the fact that it is a requirement in South Africa that a certified microdot supplier must add covert features to the microdot and to the adhesive, linking it to a specific dot manufacturer.</p> <p>§ The equipment to manufacture microdots is extremely expensive and not readily available.</p> <p>§ Counterfeited dots have never been found in South Africa to date.</p>
<p>6. Microdots can easily be detected and can therefore be removed and/or forged.</p>	<p>§ The easy detection of the microdots with cheap and readily available equipment is an advantage and not a disadvantage. Again, the strength of microdots is in the number of dots sprayed in covert and overt places.</p>
<p>7. Dots can be replaced or over sprayed by other dots.</p>	<p>§ The over-spraying of the dots will not remove the original dots. The original dot can still be found and the original identity can still be determined.</p> <p>§ The adding of alternative dots to a vehicle will only increase the probability that the original identity of the vehicle can be determined (i.e. leaving a fingerprint).</p> <p>§ Microdot suppliers in South Africa must comply with the BAC Protocols that prescribes the rules for issuing and</p>

	<p>manufacturing of dots prior to endorsement. For example, records must be kept of all dots manufactured and issued; microdots displaying a specific number (i.e. VIN or PIN) may never be reproduced. This is controlled by the databases and system used in the manufacturing process.</p>
<p>8. Police need equipment and training to be able to use the dots.</p>	<ul style="list-style-type: none"> § The reading of the dots only comes into effect if the original identifiers (i.e. VIN, Engine number) has been removed or altered and form part of the forensic investigation. Thus, it will mostly be used in the vehicle safeguarding sections. § Equipment to read dots is very cheap, readily available and easy to use. § Alternative forensic equipment to read altered VIN and Engine Numbers, imported from Europe, is 2000 times more expensive and specialised training is required. § Many covert markings can only be interpreted by OEMs and not by the police. § The cost of acquiring the service of the vehicle identification specialists from the OEMs is in most cases more expensive than the cost for one microdot reading kit.
<p>9. Microdots are not effective in reducing motor vehicle thefts and hijackings.</p>	<ul style="list-style-type: none"> § The main purpose of microdots is to secure the identity of vehicles and not to reduce vehicle thefts and hijackings. Microdots should never replace other security measurers (e.g. vehicle tracking, locks, alarm systems and immobiliser systems). § Microdots - although a passive deterrent - act as an audit trail for police services that lead back up the criminal's delivery channel. Criminals understand this and therefore prefer not to engage with the product as it increases the chances of damaging their businesses. This is therefore a pro-active approach. § An analysis that was done by Business Against Crime South Africa on the 0 to 2 year old Minibuses and Midibuses (i.e. 2005 and 2006 year models) indicated that it does have an effect in South Africa. During the analysis of the 2006 vehicle theft and hijacking information, a specific model which is 100% microdotted (i.e. Toyota Quantum) was compared with other models in this class which are not microdotted. The analysis indicated a decrease of 87% for the dotted model compared with its nearest competitor (according to number of vehicles registered) and 79% compared with the national average for this class. § The recovery rate of microdotted stolen vehicles is much higher than vehicles not marked and act therefore as a deterring factor for theft syndicates.
<p>10. Microdots are not effective in improving the recovery rate of vehicles.</p>	<ul style="list-style-type: none"> § In South Africa, vehicle tracking systems are still the most effective in recovering vehicles and should never be replaced by microdots. However, these systems are relatively expensive and not everyone can afford it. § Furthermore, the above-mentioned analysis done by Business Against Crime South Africa indicated that the recovery rate for the 100% microdotted model was a remarkable 91% compared to the 52% of other models in this class which are not microdotted.
<p>11. Microdots are not effective in identifying motor vehicles.</p>	<ul style="list-style-type: none"> § Microdots have proven to be highly successful in identifying motor vehicles in South Africa. § Police records in South Africa confirm that

	<p>all recovered vehicle of the models that are 100% microdotted (i.e. all Nissan's manufactured after October 2006 and all Toyota Quantum's) have been identified.</p> <p>§ It is accepted that the success of identifying vehicles will depend heavily on the frequency of the vehicles dotted (i.e. if not all vehicles of a model are dotted, the police might not look for the dots).</p>
<p>12. The cost of microdotting all new vehicles will be high and will increase the price of the vehicles.</p>	<p>§ In South Africa, the cost of microdotting vehicles is between R200 and R250 (i.e. +/- €20) if fitted by OEMs and if volumes are big enough. On an average vehicle, it represents less than 0.1% of the price of the vehicle. Robotic application and high volumes, could see prices reduced further.</p> <p>§ The microdotting of vehicles is used as a marketing tool in South Africa and the profit margin on it is healthy. To keep the microdotting sustainable, it is important that OEMs "sells" the microdots at a profit.</p> <p>§ There are a growing number of microdot suppliers in the SA so manufacturers will be able to freely negotiate on both product and cost.</p>
<p>13. Microdot Fitment Centres might not adhere to the protocol of fitment.</p>	<p>§ It is important that all involved parties (Microdot manufacturers, Vehicle Manufacturers or Importers, Applicators, Authorities etc) adhere to the Standard that has been developed. Without strict adherence to all requirements of a common standard, the process will be flawed.</p> <p>§ Enforcement by law to an if-fitted application of microdots and all associated activities is a prerequisite to successful and secure systems operation.</p>

Conclusion

Business Against Crime South Africa have assessed many available options and solutions to the vehicle identity problem, spreading the net both locally and internationally, and have evaluated these relative to the needs of the local environment.

Microdot technology has emerged as being head and shoulders above the rest in securing the identity of vehicles.