

# **ELECTRONIC VEHICLE IDENTIFICATION (EVI) FOR MOTORCYCLES**

## **Background**

Motor vehicles are identified by a number plate displaying a vehicle registration mark (VRM) at the front and rear of the vehicle. All number plates must meet with the Road Vehicles (Display of Registration Marks) Regulations 2001 and the current British Standard BS AU 145d. This method of vehicle identification relies solely on a visual reading or a photographic image of the number plate and the system breaks down if the wrong VRM is fitted or the VRM is unreadable.

There is evidence that some motorists are displaying the wrong VRM in order to evade fines and charges resulting in the keepers of the genuine vehicles associated with that VRM receiving enforcement notices for which they are not responsible. In addition, the use of non-compliant number plates with mis-spaced characters or non-standard fonts can result in the failure of Automatic Number Plate Readers (ANPR) to correctly identify the vehicle.

Between April and June 2006 DVLA conducted a trial of Radio Frequency Identification (RFID) for cars and motorcycles. The purpose of the trial was to determine whether RFID could be a useful and reliable supplement to ANPR as a tool for detecting stolen/cloned vehicles, Vehicle Excise Duty (VED) evasion and vehicles involved in criminal activity. The trial successfully demonstrated that police ANPR units could deploy RFID using hand held readers in a live operational environment, producing read accuracy of over 98%. A report of the trial can be found at: [http://www.dvla.gov.uk/media/pdf/other/enp\\_report.pdf](http://www.dvla.gov.uk/media/pdf/other/enp_report.pdf).

The Vehicles (Crime) Act 2001 introduced a provision to enable the making of regulations specifying additional information to be displayed on or contained in number plates. The provision would allow for the possible use of microchips in number plates. Regulations would have to be made under this enabling provision for the mandatory use of electronic number plates in a live environment.

## **Aim of Study**

The remit of this study is to consider the deployment of RFID specifically for motorcycles. The aim is to determine whether the placing of microchips in number plates or on the vehicles in a location other than the number plate would significantly improve the identification of motorcycles on the road to increase compliance with road traffic legislation, reduce VED evasion and reduce motorcycle theft.

## **Why Focus on Motorcycles Specifically?**

Motorcycles display the VRM only at the rear of the vehicle with the mark being a smaller font size. The manoeuvrability of motorcycles sometimes means that the vehicle is out of the line of sight of ANPR. These factors mean that ANPR has tended to be less effective for motorcycles than for other vehicles. There is no intention to treat motorcycles as a special case, but rather to ensure that motorcycles can be identified as successfully as other vehicles on the road.

## **Informal Consultation**

Fact-finding letters were sent to and meetings held with key stakeholders (ACPO, VOSA, number plate industry, motor cycle pressure groups, DfT technical experts). The responses and information from key stakeholders together with the experience gained from the 2006 Electronic Number Plate (ENP) trial informed this report. Discussions with stakeholders have been on an informal basis and initial responses have broadly fallen into two contrasting views. The police tend to support the use of RFID but there is significant opposition from motor cycle lobby groups.

## **Motorcycle VED Evasion**

The 2006 roadside survey showed an overall rate of VED evasion of 5%, but the rate of evasion for motorcycles was 37.8% compared with 4.3% for private and light goods vehicles. While submissions presented by motorcycle organisations to the 2007 Public Accounts Committee argued for a 50% margin of error, even this would demonstrate a substantially higher rate of evasion for motorcycles. This disparity is consistent with previous roadside surveys.

The recently published 2007 Roadside Survey estimated revenue loss through evasion amongst motorcycles at 6% and in all vehicles at 1.5%. 18% of unlicensed motorcycles were observed whilst a SORN declaration was in force and 58% had been unlicensed for at least a year. Improvements in the way that the 2007 data was collected and analysed mean that evasion estimates for 2007 are not directly comparable with those from previous years.

As well as diminishing the revenue from VED, unlicensed motorcycles often result in the records for these vehicles being out of date. An inaccurate vehicle record has an adverse impact on road safety, crime reduction and law enforcement.

If a vehicle is unlicensed it might also be without a current MoT certificate and insurance cover. Accurate data is critical to DVLA's ability to conduct its business effectively. It is a product of DVLA's business and is the basis upon which road safety and the fight against crime is facilitated. Taking enforcement action against those who evade VED is vital to establishing an accurate vehicle record.

A number of initiatives are underway to address VED evasion, including the collection of late licensing penalties and new powers announced in the Chancellor's pre-budget statement that will provide DVLA enforcement officers and wheel clamping teams with more robust powers to carry out enforcement activity in areas currently outside the scope.

Action has concentrated on deterrence via advertising and PR work. New publicity material that emphasises the serious nature of riding whilst a Statutory Off Road Notification (SORN) is in force has been developed and is currently in use. The aim is to deter evaders by emphasising that those caught will be harshly dealt with having made a false declaration as well as evading. Radio commercials have been developed and the motorcycle trade press has also been informed.

DVLA regularly targets popular events and known motorcycle haunts in order to detect evaders. It is planned to increase this activity following the development of the new DVLA area enforcement structure, which better lends itself to targeting locally known events. However, the most effective operations require the support of the police who have 'powers to stop'. This results in quality 'named' offence reports being generated and/or the impounding of motorcycles using DVLA's contractors.

### **Automatic Number Plate Readers (ANPR)**

DVLA has its own ANPR units for the purpose of taking action against VED evaders. While ANPR has proved to be very successful, around 12% of VRMs are mis-read.

All police forces in the UK use ANPR to some degree. Some are just using the vans with intercept teams and some have expanded to include CCTV. The benefit to DVLA is the increased deterrent to VED evasion and improved accuracy of records through the new information gathered. Benefit to Police is increased crime detection rates. A wide variety of offences are picked up ranging from drugs and firearms offences to illegal immigrants and vehicle documentation offences.

The police perception is that identification of motorcycles for road safety, crime reduction and VED enforcement is particularly difficult. The placement and size of the single motorcycle number plate makes ANPR less reliable than for other vehicles. In addition, the speed and agility of motorcycles makes them more difficult to apprehend.

However, the latest generation of ANPR can capture motorcycle registration marks more efficiently due to the addition of an infrared capacity and an improvement to the search and capture engine. It can read three lanes of a motorway simultaneously and if rear-facing can read the single rear plate on motorcycles. The police see RFID as an enhancement to ANPR rather than a replacement.

### **Electronic Vehicle Identification (EVI)**

The DVLA trial produced a very high read rate of over 98% and demonstrated that EVI could overcome problems associated with ANPR such as damaged/dirty/misrepresented plates and that a successful electronic read could be obtained in a variety of traffic conditions. In particular it demonstrated that electronic reads could be obtained from tags attached to motorcycles from reading equipment placed at the roadside when the bikes were approaching and retreating and while obscured by adjacent cars.

The DVLA trial used active RFID tags with their own internal power source, which is used to power the integrated circuits and broadcast the signal to the reader via a built in aerial. Hand-held readers used from ANPR vans or placed on tripods at the roadside took accurate readings at up to 200 meters in some cases. Passive RFID tags with no internal power supply were also tested. The minute electrical current induced in the antenna by the incoming radio frequency signal provides just enough power for the integrated circuit in the tag to power up and transmit a response. Most passive tags signal by back-scattering the carrier wave from the reader. The only successful reads of passive tags in the DVLA trial were from

those attached to the seat of motorcycles at very close range. The motorcycle had to pass almost in contact with the reader. All attempted reads of passive tags through car windscreens failed.

### **Practical Application in Bermuda**

The Bermuda Transport Control Department began putting RFID tags onto cars and trucks in June 2007 to administer vehicle registration. A system of Electronic Vehicle Registration has been developed. The EVR system electronically verifies whether a vehicle has a valid registration. Small windshield stickers are placed on vehicles at the time of registration. These tags are then used to verify the registration status of the vehicle. The EVR system will make compliance automated. The result of EVR is expected to be swifter processing and better recovery of fees from vehicles that are unlicensed. The Bermudan Government expects that approximately £5 million of lost fees will be recovered over the next five years. This demonstrates a practical application of RFID in road traffic management albeit in an environment with a far smaller vehicle population than the UK.

### **Options**

Flowing from the background information outlined above, the following options have been identified. Option 1 – to fit electronic tags to motorcycles is subdivided into a number of alternatives and these are examined separately.

#### **Option 1 – To fit electronic tags to Motorcycles**

Tags could be fitted to motorcycles either in the number plate or in another location, such as the seat, the tax disc holder, on a ‘stalk’ attached to the handle bars or in a container attached externally elsewhere on the vehicle. As per the DVLA trial, ANPR units could be issued with hand – held readers. The tags could be fitted just to new motorcycles or retrospectively.

#### Benefits

- RFID would complement ANPR particularly if applied to motorcycles due to the high accuracy rate as demonstrated by the DVLA trial.
- The additional information provided by RFID and ANPR could give rise to a more effective and efficient enforcement strategy, the impact of which could be seen in the reduction of VED evasion, coupled with the rise in VEL compliance.
- The partnership of EVI and ANPR would also be a useful tool in the detection of stolen/cloned motorcycles and those involved in criminal activity.
- The technology is proven and the DVLA trial demonstrated that it could be used in a live environment for enforcement/crime reduction purposes.

#### Costs/Drawbacks/Risks

- Although EVI is envisaged here only as an extension to and enhancement of ANPR technology already in use, there might be public misunderstanding, which would have to be addressed.

- There would be additional costs to Government, police, manufacturers, motor dealers and motorcycle owners. Costs would include purchasing the tags at around £10 - £20. New hand-held readers would be required for ANPR teams at a cost of approximately £1500 per unit (on the basis that around 10 units for each of the 52 Police forces this would amount to £780,000). Software development would cost around £20000.

### **1 a) - Fitting Tags to the Number Plate**

The mandatory fitting of tags to number plates would change the nature of the number plate distribution industry. Currently, most number plates are sold in component form to a wide variety of businesses including motor dealers, motor factors and fleet operators who assemble the plates for their own purposes or onward sale. There are currently over 35,000 registered number plate suppliers in England and Wales. The number plate manufacturer would have to fit the tag and write on it a unique vehicle identifier (probably the 17 digit vehicle identification number). This means that the plate would be sold to suppliers in finished form.

#### Benefits

- There is primary legislation that allows for tags to be fitted to number plates.
- This would make number plates more secure. The manufacture of complete number plates with a pre-written tag would be limited to relatively small number of manufacturers and would make the supply of number plates easier to control to prevent vehicle cloning and the use of false plates.

#### Costs/Drawbacks/Risks

- In order to ensure the security of the tag placed in the number plate it is necessary that the plate itself is secure. Theft resistant number plates are currently available for all types of vehicles with the exception of motorcycles. The plate does not sit flush to the motorcycle as with other vehicles and therefore the theft resistant plates currently available are not suitable. As theft resistant plates are a necessary prerequisite to tagging number plates, it would be essential to develop an appropriate plate for motorcycles.
- There would be significant cost implications for all aspects covering tagging number plates, from manufacturing the plate and programming tags to replacement of damaged and faulty plates. A tag fitted to a numberplate is likely to cost around £10 at the point of manufacture and possibly £15-£20 after distribution costs. With around 133,000 new motorcycle registrations taking place annually the cost would amount to around £2m per annum (133,000x£15). If the number plates were theft resistant then the cost could increase to around £3.5m per annum.

### **Option 1 b) – Fitting the tag elsewhere on the vehicle (seat, handlebars etc)**

#### Benefits

- A RFID read from a tag located somewhere other than the number plate would provide a cross – reference between ANPR and RFID for comparison. This would deter the act of simply fitting the wrong plate to the vehicle to avoid detection.

#### Costs/Drawbacks/Risks

- Mandatory fitting to other parts of the vehicle would require primary legislation in addition to requiring type approval. Motorcycles can be highly customised, all parts can be changed very easily thus making the tag in the motorcycle seat vulnerable to criminal activity and therefore not secure.
- Motorcycle manufacturers would need to ensure that a suitable space is available to house the tag.

#### **Option 1 c) - Fitting Tags to the Tax Disc Holder/Sticker**

A variation on this option was considered in the consultation exercise undertaken by DVLA in 2002 Reducing Motorcycle Evasion of Vehicle Excise Duty (VED) which can be found at: <http://www.dvla.gov.uk/media/pdf/consultations/annex11.pdf> Consultees were asked to consider the merits of “ To use the number plate to signify compliance with licensing legislation by adopting a “sticky licence” (shape and size to be determined) with an adhesive backing and constructed so that it would disintegrate/fragment with any attempt to remove it.” The sticky disc could either be attached to the number plate or elsewhere on the rear of the vehicle. The responses received did not support either suggestion.

#### Benefits

DVLA could control the manufacture and distribution of tagged tax disc/stickers. It would lend itself to electronic relicensing and would not incur additional cost for the motorcyclist.

#### Costs/Drawbacks/Risks

The tagged licence could be seen as an added incentive to steal the tax disc especially if the information contained in the tag could make an illegal bike appear legal.

#### **Option 1 d) - Retrospective Fitting**

Another aspect of option 1 is whether the tag should be fitted retrospectively or whether tags should be fitted to all new motorcycles. VOSA has indicated that retrospective fitting of used vehicles at the annual roadworthiness test would add substantially to the time and therefore the costs of the test which are currently running at £1 per minute. There are no legal powers to enable VOSA to undertake this function.

Tags could be fitted to all new motorcycles either at the construction stage, or at point of sale or by the number plate manufacturer in the case of number plate tags. The VIN would have to be written on the tag by the organisation responsible for fitting.

### Benefits

The fitting of tags retrospectively would give a clearer picture of the compliance in the motorcycle community. It would also prevent a two-tier system evolving i.e. those motorcycles tagged and those not tagged.

### Costs/Drawbacks/Risks

The roll – out process would take three years, as vehicles under three years old are not subject to testing. There are 2.1 million motorcycles (vehicle stock as of June 2007). Assuming they could not all be fitted in the first year, this would cost almost £11m for that year alone and 2.5m in the following two and three years.

### **Option 2 – To take no action**

#### Benefits

ANPR is in place and is a vital tool for the police and DVLA.

#### Costs/Drawbacks/Risks

There is a risk that VED evasion will increase if not addressed.

### **Option 3 – Alternatives for tackling motorcycle evasion.**

Apart from the financial penalties cars evading VED will often be wheelclamped/impounded. This is extremely rare in the case of motorcycles as few are seen parked at the roadside. Many vehicles, cars as well as motorcycles currently take advantage of the fact that they can park untaxed cars/bikes off the public road on Housing Association land etc. and leave them there in the knowledge that they cannot be clamped or impounded.

In his 2007 pre - budget statement, the Chancellor announced amendments to legislation that will provide DVLA enforcement officers and wheel clamping teams with more robust powers to carry out enforcement activity in areas currently outside the scope of our powers.

Measures are already underway to increase the awareness of motorcyclists who evade VED. DVLA recently launched a “No Way Out” campaign which reminds bikers not to take their bikes on the road if they have a SORN in force. The aim is to deter evaders by emphasising that those caught will be harshly dealt with having not only made a false declaration but evaded VED as well. Additionally, DVLA has doubled its wheel-clamping operation tightening its enforcement regime.

#### Benefits

- Any publicity campaigns that highlight the problems of evasion can only be beneficial.
- Amendments to legislation announced in the Chancellor’s pre-budget report are going to be particularly beneficial to detect evaders. DVLA enforcement officers

and wheel clamping teams will have more robust powers to carry out enforcement activity in areas, which are currently outside the scope.

### Risks/Drawbacks/Costs

Does not tackle the limitations of ANPR.

### **Conclusion**

A very high level estimate for fitting tags to the 2,126,557 bikes on record (as of June 2007) and the 133,000 new bikes sales for 2007, together with hand-held readers for police ANPR units and IT developments is over £100 million. This would be for the cheapest option as in the DVLA trial. Achieving 100% compliance on motorcycle VED would bring in approximately £27 million for HMT. The cost of number plates vary and the latest information from the trade suggests that a chipped plate would cost little extra. We have used £15 per plate as an estimated cost for the purpose of calculations.

RFID is a tried and tested technology with a wide range of practical applications. It is increasingly being seen internationally as a tool for the management of road traffic and vehicle registration systems. Indeed, there is a new CEN/ISO standard for RFID due for publication in 2008.

### Recommendation

The remit of this report is to consider the deployment of RFID specifically for motorcycles, especially in the context of VED evasion. Given the practical, legal and cost issues outlined above together with the ongoing improvement in ANPR performance, the Agency's improved publicity and wheelclamping campaigns, RFID for this specific purpose alone would not add sufficient value to justify implementation at this stage.

However, this is not to say that the use of RFID in road traffic management is ruled out. The Department for Transport and DVLA continue to monitor developments in this field and to assess the potential for practical application.

The favoured option emerging from this report is option 3 – to pursue alternative methods of tackling evasion.