Home Office
Building a safe, just and tolerant society
Police Standards Unit

ACPO

PA Consulting Group

Driving crime down

Denying criminals the use of the road

October 2004

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Home Secretary's Introduction

"I am pleased to be able to present this evaluation of the pilot of automatic number plate recognition intercept teams. I am very grateful to the police forces that have taken part, and thank the officers involved for their high levels of commitment and effort that have been shown to have delivered such impressive results.

The outcomes from the pilot are impressive:

- Between June 2003 and June 2004, ANPR teams across 23 forces produced nine/ten times the national average arrest rate per officer, totalling more than 13,000 arrests
- Over the same period, officers recovered property and drugs worth well in excess of £8 million.
- The average ANPR-intercept officer is responsible for 33 offences brought to justice each year – three times the rate for other forms of policing.
- The Home Office estimates that national roll-out of ANPR would lead to approximately 26,400 additional offences being brought to justice each year – a significant contribution of around 15% towards meeting the Governement's target for offences brought to justice.

Although it is only one policing tool, ANPR has uses in a range of areas, including tackling volume crime, serious & organised crime, counterterrorism, and in intelligence gathering. It has also proven a great asset in tackling the 'underclass' of vehicles that are incorrectly registered, untaxed and uninsured.

In recognition of this, ANPR is integral to delivering the Home Office's policy objectives as set out in *Confident Communities in a Secure Britain,* the Home Office strategic plan for the next five years. It is also a crucial element of the joint Home Office, Department for Constitutional Affairs and Crown Prosecution Service strategy for reforming the criminal justice system: *Cutting Crime, Delivering Justice*. The experience gained in the pilot, highlighted by the evaluation work, is likely to lead to the introduction of ANPR enabling legislation as soon as Parliamentary time allows. The recent Greenaway Report on uninsured driving also included recommendations to maximise the effectiveness of ANPR. DfT are currently planning measures to implement these.

The achievements and good practice established during the pilot provide an outstanding foundation for rolling out the concept of ANPR nationally. This, together with further development suggested by the evaluation, and stronger partnership working, brings us closer to our ultimate aim of denying criminals use of the roads."

David Blunkett

Rt Hon David Blunkett MP
Home Secretary
October 2004

Acknowledgements

This study, commissioned by the Home Office Police Standards Unit (PSU), would not have been possible without the co-operation of the police forces involved. We would like to thank the Chief Constables, intercept teams and support staff of the 23 police forces that took part in this project, namely:

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The views expressed in this report are those of the authors, not necessarily those of the Home Office Police Standards Unit or the Association of Chief Police Officers. The consultants who worked on this project were Charlie Henderson, Panikos Papagapiou, Adrian Gains and Jim Knox. Any queries in relation to this report should be directed to charlie.henderson@paconsulting.com

Executive summary

ANPR is not a new technology, but it was only recently that the full potential to tackle criminality was beginning to be realised

In 2002, a number of police forces increased their use of Automatic Number Plate Recognition (ANPR) systems to include dedicated intercept officers. These officers were able to intercept and stop vehicles of interest identified by the ANPR systems and question the driver and/or passengers as appropriate. The intention was that targeted enforcement would detect, disrupt and deter criminality. A six-month evaluation of the use of these dedicated intercept officers ('Laser 1') showed the concept to be extremely effective, achieving arrest rates many times that of conventional policing.

Although these results were encouraging, there was no funding set aside for the national testing, roll-out and operation of ANPR-enabled intercept teams. An innovative funding mechanism was, therefore, required. Following a submission to HM Treasury, conditional approval was given to the Home Office to test a cost recovery system for dedicated ANPR-enabled intercept teams. This would allow police to target vehicle documentation offences and crime in general with the activity part-funded through receipts from the fixed penalties issued by these teams.

Since 1 June 2003, 23 forces across England and Wales have operated dedicated intercept officers part-funded under cost recovery ('Laser 2').

This report presents the findings of the evaluation of Laser 2 for the period 1 June 2003 to 31 June 2004.

The use of ANPR intercept teams is aligned with Government policy

The use of ANPR-enabled intercept teams to engage criminality on the road is clearly aligned with a number of key objectives for the Police Service, including the National Policing Plan, Strategic Plan for Criminal Justice 2004-08, the Police Service's National Intelligence Model and the Association of Chief Police Officers (ACPO) Road Policing strategy. The use of ANPR-enabled intercept teams also contributes to wider objectives, specifically road safety (eg enforcing the offences of not wearing seat belts and illegal use of mobile telephones while driving) and excise collection (eg ensuring that all vehicles on the road are appropriately taxed).

This also addresses the public's desire to see more 'officers on the street' and more action taken against illegal drivers. Given the link between vehicle documentation offences (which can be relatively easily identified from national databases) and wider criminality, it can be shown that the targeting of these offences through the use of ANPR-enabled intercept teams can make a significant contribution to wider policy objectives.

During Laser 2, ANPR has been evaluated in 23 forces for over a year

During the course of Laser 2 project, the total staff input across 23 forces was 368,446 hours – this equates to 192 Full Time Equivalents (FTEs), the majority of whom were police constables. By the start of the second year of Laser 2 there were approximately 515 officers involved in ANPR related operations.

The majority of ANPR officers' time (77%) was spent either on intercept duties or travelling to and from intercept duties. This level of visibility is significantly higher than a 'typical' police officer – a Home Office report identified that on average a typical police officer spent only 57% of their time away from their police station. Further, ANPR intercept officers, whether they are travelling to and from intercept sites or undertaking intercepts can also respond to incidents as necessary when they occur.

A key aspect to the successful exploitation of ANPR intercept teams was senior officer commitment to the programme – this ensured that resources were available as and when required and other officers across the force provided appropriate intelligence for the ANPR teams to operate on.

The results from Laser 2 have been impressive

The ANPR intercept teams stopped a total of 180,543 vehicles.
From these stops, the intercept officers:

- arrested 13,499 persons, including:
  - 2,263 arrests for theft and burglary
  - 3,324 arrests for driving offences (for example driving whilst disqualified)
  - 1,107 arrests for drugs offences
  - 1,386 arrests for auto crime (theft from and of vehicles)
- recovered or seized property, including:
  - 1,152 stolen vehicles (valued at over £7.5 million)
  - 266 offensive weapons and 13 firearms
  - drugs worth over £380,000 from 740 vehicles
  - stolen goods worth over £640,000 from 430 vehicles
- issued fixed penalty notices, including:
  - 22,825 tickets for failing to display Vehicle Excise Duty (VED)
  - 6,299 for no insurance
  - 1,496 for no MOT
  - 20,290 for a variety of offences, including not wearing a seat belt, using a mobile telephone whilst driving.

The evaluation also confirmed previous research that had found a correlation between vehicle documentation offences and volume crime – 3,530 of all arrests (26%) originated from vehicle stops from No VED or current keeper.

Tracking a sample of these arrests through the criminal justice system, it was found that an average ANPR full time equivalent will contribute around 31 offences per annum towards to the Government's Offences Brought to Justice (OBTJ) target – this is over three times the rate for conventional policing. If an ANPR intercept team was deployed by each Basic Command Unit this would contribute 26,400 additional OBTJs per annum towards the target – around 15% of the Government's target. Since Laser involves redeploying existing resources more effectively, this represents little incremental costs and hence good value for money.

The expansion of Laser 1 to Laser 2 has shown that the results achieved within a small-scale pilot can be achieved across a much wider cross-section of forces and that these results can be sustained over time.

ANPR has helped pay for itself

Overall the cost recovery process released an additional £1 million in total to the 23 Laser 2 forces over a nine-month period (to the end of the first financial year of the pilot). The controls and processes have worked well – while forces were required to collect additional information and were able to issue new fixed penalties, there was no evidence to suggest that operational priorities were distorted – forces achieved comparable arrest rates to Laser 1 where no cost recovery operated.

Given the focus on recovering monies from Fixed Penalty Notices (FPNs), the Laser 2 evaluation highlighted the low payment levels associated with some fines. In particular, the introduction of a £200 fine and 6 penalty points for no insurance was intended to reduce the burden on courts. However, with just a 14% payment rate, this has not proved to be the case.

Conclusions

In terms of operation, the use of ANPR intercept teams represents an innovative approach:

- targeting vehicle documentation enforcement to engage with and disrupt criminals
- delivered through an intelligence-led piece of technology (an ANPR reader)
- benefiting from officers' experience (eg observations of vehicle drivers)
- supported by existing policing processes (eg prisoner handling).

On this basis we can conclude that ANPR-enabled intercept teams have been shown to be an extremely effective means of engaging with criminals. Laser 2 has built upon the significant success of Laser 1 by proving the concept across a wider range of forces, over a longer time period and with a greater level of resource. Using a range of police intelligence and experience, Laser 2 intercept teams were able to disrupt criminal activity in an efficient and effective manner, bringing more than three times the number of offences to justice compared to conventional policing.

While the cost recovery element realised less than 10% of the expenditure incurred, these monies were important, for example, in helping to improve the intelligence capability of the ANPR teams and providing part of the administrative support required. On this basis, we conclude that the cost recovery aspect contributed to the overall success of Laser 2. The pilot identified a number of areas where operations could be improved (in particular by having more accurate data). Once these areas have been addressed, it is expected that ANPR will be an even more effective policing tool than was shown.

Recommendations

The evaluation highlighted a number of recommendations, including:

- **Roll-out of Project Laser** – Project Laser has proved that ANPR intercept teams, if used appropriately, can be an extremely effective police tool in engaging and dealing with criminality in all its forms. There is a strong case that Laser is rolled out nationally and this roll-out proceeds as rapidly as possible to ensure that the benefits to police and society are achieved. Cost recovery can then be used as a means of supplementing local force expenditure, in particular in the improvement of intelligence and its handling.
- **A review of data used for ANPR** – the accuracy of the DVLA database in particular needs to be investigated. There are also substantial variations in the quality and accuracy of local intelligence databases that require investigation. There should be more effective use of intelligence at a national and local level. Further, the pro-active use of MOT and no insurance databases, planned in the near future, are an important development and should increase the productivity of the ANPR intercept teams. These should be fully evaluated in terms of their strengths and weaknesses.
- **A national vehicle intelligence data warehouse** – other than for the services provided by PNC, police forces have to operate with a series of local databases that are copied and shared between forces. This is a time consuming and ineffective way of operating and is a further example of the lack of joined up intelligence management highlighted by the Bichard enquiry report. There is a need for a national data warehouse to hold all vehicle intelligence to be read in real time by all ANPR users nationally. In turn, this data warehouse would also hold ANPR reads and hits as a further source of vehicle intelligence, providing great benefits to major crime and terrorism enquiries. A means to fund provision of this data warehouse should be urgently sought by Government.
- **Deployment management** – currently, most ANPR teams are tasked and deployed from a central location. This can mean, in some areas, that considerable time is spent travelling to and from ANPR intercept sites. Clearly, this is not best use of police time and we suggest that consideration is given to co-locating ANPR intercept teams with BCUs and roads policing units, as appropriate. Support systems will need to be put in place to ensure best practice and intelligence is shared and performance monitored as a whole.

- **A review of level of fines and payment rates** – there is an apparent disconnect between the levels of fixed penalties for the more serious offences and the penalties that are awarded if the case is taken to court – anecdotal evidence suggests that in some cases penalties are less severe in court, both in monetary value and the number of points awarded. This could potentially damage the effectiveness of the fixed penalty scheme and needs to be urgently reviewed by ACPO and the Department of Constitutional Affairs (DCA).
- **Development of a national ANPR strategy** – we recommend that the Home Office and Department for Transport, working with other Government departments and key stakeholders, develop a detailed strategy and implementation plan for ANPR for the next few years.

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Introduction

In 2002, police forces started to use Automatic Number Plate Recognition (ANPR) systems together with dedicated intercept officers. These officers were able to intercept and stop vehicles of interest identified by the ANPR systems and question the driver and/or passengers as appropriate. The intention was that targeted enforcement would detect, disrupt and deter criminal use of the roads. A six-month evaluation of the use of these dedicated intercept officers ('Laser 1') showed the concept to be extremely effective, achieving arrest rates many times that of conventional policing.

Although these results were encouraging, there was no additional funding available for the national testing, roll-out and operation of ANPR-enabled intercept teams. An innovative funding mechanism was therefore required. Following a submission to HM Treasury, conditional approval was given to the Home Office to test a cost recovery scheme for dedicated ANPR-enabled intercept teams. This would allow police to target vehicle documentation offences and crime in general using ANPR-enabled dedicated intercept teams, with the activity part-funded through receipts from fixed penalties issued.

Since 1 June 2003, 23 forces across England and Wales have been operating dedicated intercept officers part-funded under cost recovery ('Laser 2'). This report presents the findings of the evaluation of Laser 2 for the 1 June 2003 to 31 June 2004.

1.1 Context

1.1.1 Background to the use of Automatic Number Plate Recognition

ANPR is an established technology that enables vehicles observed by cameras to have their vehicle registration mark (VRM) 'read' using pattern recognition software. When combined with other resources and data, ANPR can be an extremely powerful tool in:

- Road tolling – for example, the London Congestion Charging Scheme uses ANPR-enabled cameras to identify vehicles passing in/out of the congestion charge zone. This information is subsequently used to levy tolls and to penalise non-payers
- Vehicle tax evasion – for example, the Driver and Vehicle Licensing Agency (DVLA) uses ANPR as part of a system to ensure that vehicles on the road have a current Vehicle Excise Duty (VED)
- Congestion warning – for example, Trafficmaster uses a national network of ANPR cameras to measure speed between cameras and, from this, identify areas of the road network that are congested. This is then used to provide information to drivers.

The police have used ANPR systems at strategic points for a number of years, for example at ports, tunnels and in the 'ring of steel' around the City of London as part of counterterrorism measures. With the improvements in ANPR technologies (which have led to increased accuracy of read and the ability to process images more rapidly) and a reduction in costs of ANPR and camera equipment, the police have begun to look to ANPR as a proactive tool to help address volume crime.

1.1.2 Laser 1 – developing the concept

Recognising the potential of ANPR, the Home Office provided each police force in England and Wales with a mobile ANPR unit and back office facility in 2002. With this equipment, forces came to recognise that one of the most effective ways of exploiting ANPR was to use it with dedicated intercept teams, typically comprising around six police officers operating either on motorcycles or from cars. These officers could then intercept and stop vehicles identified by the ANPR system as worthy of interest, and were thus called an 'ANPR-enabled intercept team'.

Given that the use of ANPR-enabled intercept teams represented a significant development in policing in terms of using technology and intelligence, the Home Office Police Standards Unit (PSU) and the Association of Chief Police Officers (ACPO) decided to undertake a small-scale pilot over a six-month period (30 September 2002 to 30 March 2003) – 'Laser 1'.

Nine forces were selected to take part in the pilot, reflecting a cross-section of force types and geographies.

The aim of the pilot was to gather evidence on the operations and impact of ANPR-enabled intercept teams to inform policy and potential national roll-out. These teams stopped 39,188 vehicles, arrested over 3,000 persons (of which only 20% were for driving-related matters) and took a further 45,000 actions. These included issuing verbal advice or a fixed penalty, or requesting that vehicle documentation, such as MOT certificate and vehicle insurance, be presented at a local police station.

An independent evaluation of Laser 1 concluded that:

> "ANPR-enabled intercept teams have shown to be an extremely effective means of engaging with criminals. Using a range of police intelligence and experience, intercept teams were able to disrupt criminal activity in an efficient and effective manner, achieving arrest rates ten times the national average."[1]

1.1.3 Laser 2 – testing cost recovery

Although Laser 1 provided encouraging results, there was no additional funding set aside for the national testing, roll-out and operation of ANPR-enabled intercept teams. However, following a submission to HM Treasury, conditional approval was given to the Home Office to test a cost recovery scheme for dedicated ANPR-enabled intercept teams. This would allow police to target vehicle documentation offences and crime in general, with the activity part-funded through receipts from fixed penalties issued.

Following discussions at the National ANPR Project Board (membership listed in Appendix F), it was decided to undertake a more widespread testing of ANPR, this time (part) funded by cost recovery – 'Laser 2.' The specific objectives of Laser 2 were as follows:

- to demonstrate whether or not ANPR-enabled intercept teams could continue to make a significant contribution to the detection of a wide variety of crimes
- to demonstrate that the primary motivation behind the additional activity was to address criminality, not create revenue
- to inform a policy decision regarding whether or not to introduce primary legislation to allow for the national roll-out of cost recovery
- to identify and disseminate good practice to maximise the effectiveness of the teams

[1] *Engaging criminality – denying criminals use of the roads*, PA Consulting Group (October 2003)

- to demonstrate workable, non-bureaucratic arrangements for recovering the costs of the intercept teams that did not distort from existing policing priorities and operations
- to test the rules and guidelines that were prepared for ANPR cost recovery.

All forces were invited by the Home Office and ACPO to participate in Laser 2. Following submission of cases to the National ANPR Project Board, 23 forces (including all nine from Laser 1) were accepted onto this further pilot that started on 1 June 2003.

Part of ANPR enforcement was intended to be funded through receipts from fixed penalties issued for vehicle documentation offences by the ANPR teams. The cost recovery element was governed by a number of rules and guidelines, to which all 23 Laser 2 forces subscribed. The aim of these rules and guidelines was to ensure the cost recovery element did not distort the way in which ANPR was used to the detriment of fundamental policy objectives.

The start of Laser 2 also coincided with the introduction of four new fixed penalties, three of which were particularly relevant to ANPR teams, namely:

- driving without insurance
- driving without MOT certificate (where required)
- not displaying a vehicle excise licence.

Throughout the pilot, the PSU and ACPO supported individual forces by disseminating good practice and feeding back performance measurement reports.

1.2 Evaluation methodology

1.2.1 Approach

PA Consulting Group (PA) was commissioned by the PSU to undertake an independent evaluation of the operations of ANPR-enabled intercept teams. In parallel, a team within the PSU was charged with developing the good practice guide. In undertaking the evaluation, PA worked closely with this team to understand practices that worked well and where specific interventions had been undertaken by PSU. PA also provided information to forces and the PSU to help identify good practice.

The PSU have developed a good practice guide that addresses key issues around human resources, technologies and operational practices.

The basis for the evaluation was as follows:

- preparation of a data collection model – this recorded key information on activities undertaken by the intercept teams and the resource requirements of these teams. The data collection pro formas used as part of this model are listed in Appendix B
- collation of this recorded information, data cleansing and validation
- briefings and field visits to each of the participating forces to ensure that data was collected in a consistent manner and to discuss the operation of ANPR-enabled intercept teams.

1.2.2 Data collection

Operational information was collected weekly from each Laser 2 force.
For each day of operation, this was:

- total ANPR reads and hits
- officer hours (by rank) for:
  - ANPR intercept deployment and non-intercept, eg breaks, travelling time
  - prisoner handling up to booking in or handing over
  - ANPR admin/spreadsheet data input
- for each vehicle stop:
  - day, date, time, location and VRM
  - trigger database (or observation) and accuracy of database
  - property recovered
  - actions taken, including number and type of fixed penalties issued and arrests made
  - crime file reference numbers (to allow for tracking of cases) where relevant
  - ethnicity of vehicle driver and arrested persons.

Further information collated from forces on a quarterly basis included:

- headcount numbers of persons involved in the project
- revenue expenditure, including:
  - staff salaries and on-costs (training, national insurance, etc) by rank/grade

  - IT and communication systems, including maintenance, associated with ANPR activity
  - vehicle lease, maintenance and running costs (including fuel)
  - consumables and ancillary costs
  - leased accommodation (including office and IT equipment if applicable)
- agreed capital expenditure
- the number of fixed penalties issued, what these were issued for and whether they were paid or whether the case has gone to court
- progress and variation against their operational case, highlighting any significant variations and seeking permission for any change in expenditure.

1.2.3 Data validation

Every effort was made to improve data quality, including making the data collection pro forma straightforward to use, hosting seminars with ANPR project managers to discuss data collection issues, building basic checks into the data entry model, undertaking random checks of data and ensuring that data was logically consistent.

However, given the scale of collection (180,543 vehicles stopped and with over 2 million data items recorded by the 23 forces) it was inevitable that there would be a number of inconsistencies in data collection. The main areas of inconsistency were:

- Different coding practices. For example, officers recorded the ethnicity of the vehicle driver using codes reflecting their own force practice rather than a national standard.
- Recording practices. For example, because of the variety of make-up of ANPR intercept teams (see Chapter 4 below), there was some inconsistency between forces in measuring officer hours input.

Part of the data cleansing process involved identifying anomalies and seeking to address them almost immediately; with the aim of improving the quality of data during the pilot period. In practice, after the first month data inconsistencies tended to be isolated rather than routine and procedures were developed to automate the data validation.

In spite of these issues, the vast majority of the data appears robust and the large number of records allows some compelling conclusions to be drawn about the benefits of ANPR-enabled officers compared to conventional policing.

1.2.4 Performance feedback

As part of the data collection cycle the PSU and the 23 forces were provided with a weekly progress report, one week in arrears. This gave quick feedback on performance, both relative to other forces and over time, and provided a means for forces to validate high-level information submitted. The electronic reports allowed forces to analyse their own data as required – in sufficient time to make changes to operational deployment. A copy of the headline page of the electronic report is shown in Figure 1.1 below.

Figure 1.1: Weekly reporting tool provided to Laser 2 forces (front page only)

Overview			
Number of stops	136,857	Staff-days on intercept duty	3,657
Number of arrests	10,546	Staff-days travel to intercept	1,661
Fixed penalty notice	40,228	Staff-days prisoner handling	414
Pilot arrests per FTE	95	Staff-days spent on admin	1,100

Arrests breakdown	
Robbery	58
Theft / burglary	1,795
Driving	2,611
Drugs	946
S25	1,136
Auto crime	1,064
Warrant	1,340
Other	1,596

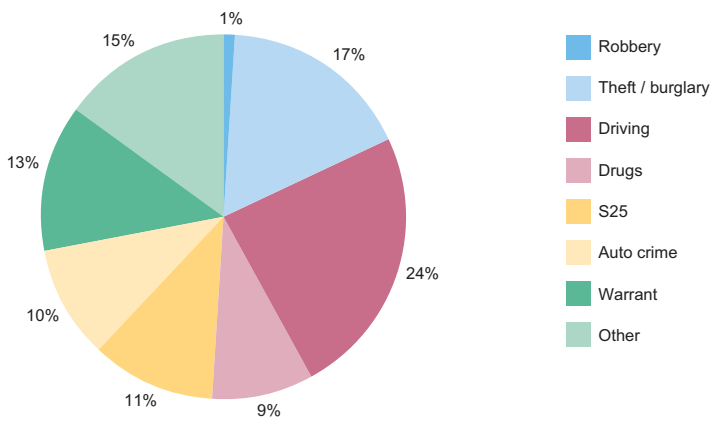
FRNs breakdown	
Endorsable: No insurance	4,923
Endorsable: Other	2,112
Non-end. No MOT	1,166
Non-end. No VED	18,381
Non-end. Other	13,646

Property recovery	
Stolen vehicle	874
Stolen goods	333
Firearms	8
Drugs	589
Offensive weapon(s)	159
Other property	282
Value of stolen vehicle	£5,671,304
Value of stolen goods	£421,453
Value of drugs	£381,384
Total property recovered	**£6,474,140**

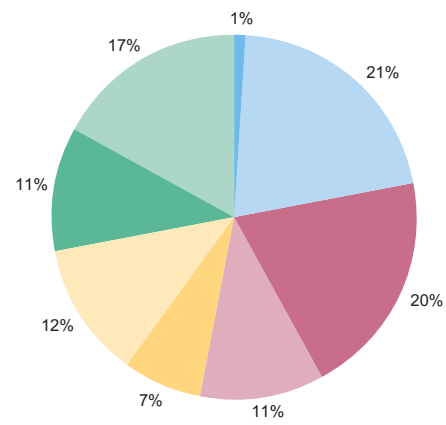
Actions taken	
HO/RT1	35,580
CLE 2/6 (7)	3,991
CLE 2/8 / V62	14,177
VDRS / PG9	3,009
NEFPN	31,754
EFPN	7,593
Reported for summons	6,117
INTEL log generated	19,542
Verbal advice given	15,104
No action taken	48,916

Detailed weekly view	Click here to look how each force is performing on a weekly basis
Arrests / FTE	Click here for the LASER 2 "Arrests per full time equivalent" chart
Total arrests	Click here to view comparison of total arrests and breakdown by force
FPN targets	Click here to see how each force is performing against its FPNs target
FPNs issued	Click here to view all FPNs issued by force. Breakdown also provided
Deployment time	Click here to see how force deployment times compare
Old summary view	Click here to see weekly results in the original format
Arrests / FPNs per 100 stops	Click here to see arrests and FPN performance per 100 stops
Arrests / FPNs per 100 hours	Click here for arrests and FPN performance per 100 intercept hours
Stops	Click here to compare the volume of stops achieved by each force

Arrests breakdown in Laser 2



Arrests breakdown for Laser 1



For the 14 additional forces joining Project Laser in June 2003, there was a significant project mobilisation stage. In practice many of these forces were unable to deploy their intercept teams for the first weeks of the pilot, and when they were deployed, they were still developing their operational strategy. Moreover, the data collection process took time to 'bed-down'.

In recognition, the National ANPR Project Board extended the period covered by the evaluation to a 13 month period to allow analysis of one year's good quality data. Thus in reviewing these findings a number of points are worth noting:

- While ANPR is an established technology, for many forces the use of ANPR-enabled intercept teams represented a new way of working. As such, operations changed to reflect feedback from the field. Also most forces used the pilot as an opportunity to develop the way they used ANPR and varied the way they deployed intercept teams in response to operational experience. These evaluation results thus do not cover a 'steady state' period – for example this evaluation report shows that performance improved over the year for the 14 forces new to ANPR.
- Weeks 30 and 31 covered the Christmas period and operations were much reduced.
- During January 2004, forces were invited to submit operational cases for June 2004 to May 2005. The majority of forces chose to continue ANPR operations as before, though some forces re-evaluated and restructured their ANPR operations to reflect local operational needs (eg Avon and Somerset included prisoner handling as a core function of the ANPR team, while Leicestershire devolved ANPR operations to Basic Command Unit level).

1.2.6 Contribution to Narrowing the Justice Gap

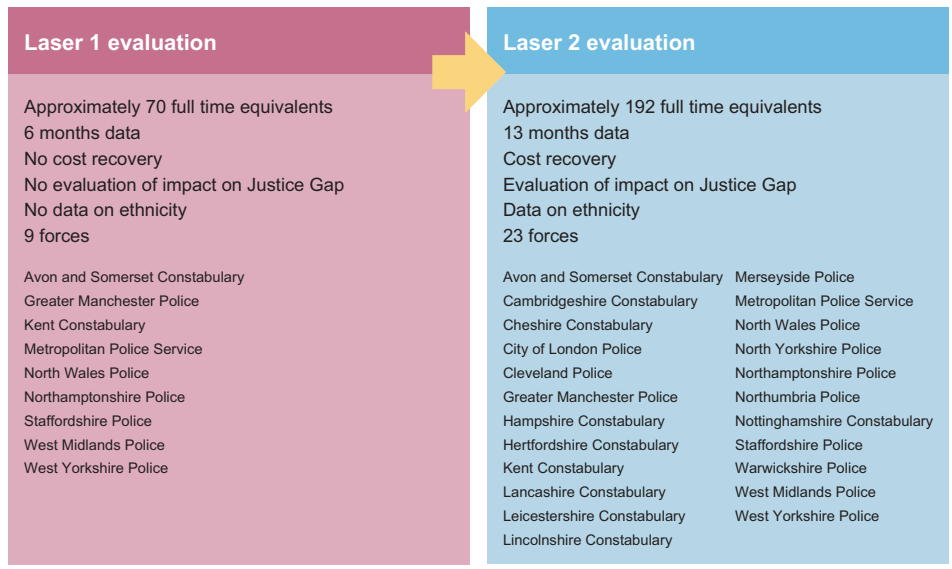
Laser 1 had shown that ANPR was a particularly effective tool for targeting police resources, producing arrest rates many times those normally achieved. Laser 1, however, had not collected information on the outcome of these arrests. This information was key to evaluating the potential impact of ANPR on the justice system and the Government's target for the number of Offences Brought To Justice (OBTJ) programme.

Following a presentation to the Narrowing the Justice Gap (NJG) taskforce, we were asked to review the outcome of these ANPR-generated arrests and to estimate their contribution to the Government's target. As part of this exercise, Laser 2 forces were asked to provide information on the outcomes of the arrests they made between June 2003 and August 2003.

A number of forces were able to provide this information from their existing information systems. While the results of this analysis have already been presented internally to the Narrowing the Justice Gap taskforce, the main conclusions are also re-presented here for the sake of completeness.

1.3 This report

This report presents the findings of PA's evaluation of Laser 2. The purpose of this evaluation was to explore the validity of ANPR-enabled intercept teams, not to assess relative performance of intercept teams between forces. Results presented have therefore been aggregated across the 23 forces, though where appropriate these have been broken down by force. In terms of coverage, the diagram below sets out the difference between this report and the evaluation of Laser 1.



This report is set out in nine further chapters as follows:

- chapter 2 gives policy background of ANPR-enabled intercept teams
- chapter 3 provides an overview of Laser 2 ANPR-enabled intercept teams and how they operate
- chapter 4 outlines operational staff inputs used during the pilot
- chapter 5 identifies ANPR reads, hits and stops, that is the number of VRMs read by the ANPR units, the number of times these reads led to a match with an intelligence database, and the number of vehicles of interest stopped by the intercept teams
- chapter 6 examines database issues
- chapter 7 looks at the actions taken, the property recovered and arrests

- chapter 8 looks specifically at the cost recovery aspect, including the cost of ANPR operations and the fine penalties recovered
- chapter 9 examines the outcome of ANPR arrests and presents the potential contribution that ANPR could make to the Government's target for Offences Brought to Justice
- chapter 10 sets out the evaluation conclusions in terms of the original objectives for the pilot and on this basis makes a number of recommendations.

This report also has eight appendices as follows:

- appendix A lists the acronyms used in this report
- appendix B shows the data collection pro forma as used by the intercept teams
- appendix C presents a summary of data completeness by field
- appendix D lists all Fixed Penalty Notices that were included within this pilot
- appendix E presents some ANPR case studies from forces as presented on their websites
- appendix F lists the representation on the National ANPR Project Board
- appendix G provides outline guidance on recorded offences
- appendix H lists documents referenced throughout the report.

In all the graphs and tables in this report, Week 1 refers to the first week of the evaluation period, ie June 1 2003. Weeks 30 and 31 therefore covered the Christmas/New Year period.

For some of the analysis column totals may differ slightly from the total displayed due to rounding.

Officers of the 23 forces involved in Laser 2 have provided the data used to compile this report (on a weekly basis).

Strategic context

This section of the evaluation sets out the strategic context for the operation of ANPR-enabled intercept teams. This covers four broad areas.

First, part of the Government's vision for the criminal justice system is to bring an additional 150,000 offences to justice in 2008 than is currently the case and to share information within the system more effectively to reduce inefficiencies. Within their strategy, the Government identifies ANPR as a key means to improving police effectiveness [Section 2.1].

Second, the introduction of the National Intelligence Model within the Police Service and the findings of the recent Bichard inquiry provides a strong focus for police to ensure information is fully researched, developed and analysed to provide intelligence for policing and police managers across forces [Section 2.2].

Thirdly, the ACPO Road Policing Strategy sets out a clear objective of detecting, disrupting and challenging criminal use of the roads. To achieve this it is planned that police will make full use of modern technology, in particular that approximately 2,000 officers will deliver an intercept capability ANPR. This equates to a police intercept team in every Basic Command Unit area [Section 2.3].

To support this ACPO have developed an ANPR strategy for the police. At present, however, there is no complementary strategy for use ANPR across other Government bodies, including DVLA, DfT, Customs & Excise, the Highways Agency, VOSA, and the ports authorities [Section 2.3].

Finally, this section identifies that there is substantial evidence that the pursuit of vehicle documentation offences will lead to more serious crimes being detected and that relatively little police time is spent undertaking proactive vehicle documentation checks. As such, there is an opportunity being lost to address wider criminal issues. If this were addressed by means of ANPR-enabled intercept teams, this would also meet the public's desire to see more 'officers on the street' and more action taken against illegal drivers [Section 2.4].

2.1 Policy context

In the recent strategic plan for the Criminal Justice System[2] the Government sets out a vision for the criminal justice system for 2008. This vision is built around five key objectives:

- "The public will have confidence that the Criminal Justice System is effective and that it serves all communities fairly.
- Victims and witnesses will receive a consistently high standard of service from all criminal justice agencies.
- We will bring more offences to justice through a more modern and efficient justice process.
- Rigorous enforcement will revolutionise compliance with sentences and orders of the court.
- Criminal justice will be a joined up, modern and well run service, and an excellent place to work for people from all backgrounds."[3]

[2] *Cutting Crime, Delivering Justice: A Strategic Plan for Criminal Justice 2004-08,* Home Office/DCA (July 2004)

[3] Ibid (July 2004), p9-10

In terms of the primary objective of an effective criminal justice system, the strategic plan sets out the Government target of bringing 150,000 more offences to justice in 2008 and states:

"We will raise the detection rate from 19% to at least 25%, by improving police effectiveness and deploying new technology, including enhanced DNA testing and Automatic Number Plate Recognition systems, across the country to target criminals more effectively."[4]

The strategic plan also identifies the need for better intelligence and information-sharing across the criminal justice system. It highlights that there is no single data source to identify individuals who may be wanted by a number of police forces and courts for fine arrears, failing to appear in court or probation breaches. This means that agencies are often pursuing the same offender separately for breaches of different types of warrant. The police may arrest someone and bail them without knowing about outstanding warrants for them. Equally, unknown to a court, a defendant appearing in front of them may have failed to answer charges elsewhere or have other outstanding fines or community punishments. This leads to poorly-informed decisions, frustration on behalf of the professionals involved and unnecessary costs; it also helps undermine public confidence in criminal justice.

To address this, the strategic plan sets out a key change in information sharing, namely:

"We are giving direct access to the Police National Computer to all Magistrates' Courts Committees by Autumn 2004. This will enable warrants to be entered promptly onto the system so police are aware of and can act on them. We will also link this into the ANPR system so that offenders wanted on warrants can be identified when their car is spotted by an ANPR camera."[5]

[4] Ibid (July 2004), p10
[5] Ibid (July 2004), p42

The Government's commitment to tackling vehicle crime and, in particular, addressing the problem of uninsured driving was outlined in the Government's response to the publication of the Greenaway report in August 2004[6]. The Road Safety Minister David Jamieson announced that the Government will:

- give the police the power to seize and, in appropriate cases, destroy vehicles that are being driven uninsured
- link the DVLA's Vehicle Register and the Motor Insurance Databases, allowing police to know which vehicles on the road are uninsured
- allow fixed penalties for people who ignore reminders that their insurance has expired.

The DfT also wants to see and is discussing with relevant stakeholders:

- concerted action by insurance companies to continue to improve the Motor Insurance Database
- simpler and clearer notification procedures so that no one is in any doubt when their insurance expires
- automatic reminders sent out to those motorists who forget to insure on time.

David Jamieson, Parliamentary Under-Secretary of State in the Department for Transport said:

"I very much welcome Professor Greenaway's report. We know that lawabiding motorists are fed up with paying the price for the small, hard core of antisocial motorists who drive uninsured, often in untaxed or unsafe vehicles.

The Government is determined to tackle head on the menace of uninsured driving. That is why I have announced today that we plan to give the police the power to seize and destroy vehicles that are being driven illegally and to increase police powers to use new technology to make detection and enforcement more effective.

We are also working closely with the insurance industry to improve detection of drivers who fail to insure their vehicles and to raise awareness of the need for motor insurance. The message to the small hard core of antisocial motorists who drive without insurance is clear – uninsured driving is unacceptable."[7]

[6] *Uninsured Driving in the United Kingdom*, Professor David Greenaway (July 2004)
[7] David Jamieson, DfT press release 11 August 2004

Caroline Flint, Parliamentary Under-Secretary of Stete in the Home Office, added:

"Uninsured driving victimises the law-abiding motorist. This report gives a sensible way forward to tackling the problem and across Government we will work hard to take forward its recommendations. We want to ensure that the police and courts have the powers they need to tackle offenders and that they can use them effectively.

We are also working closely with the police to ensure that the hugely successful Automatic Number Plate Recognition system is used as effectively as possible to target those who flout the law and drive without insurance."[8]

Finding 1. The Government views ANPR as a key tool for bringing more offences to justice and to identify and pursue the estimated 1 million motorists that drive without insurance as well as those wanted on warrant.

2.2 The drive to make better use of intelligence

The use of ANPR-enabled intercept teams is an excellent example of an intelligence-led policing tool. This section looks at the current drivers for making best use of police intelligence. This applies at both a National and European level, with ANPR expected to be a key part of policing international borders and sharing intelligence across European states as part of the Schengen Acquis.

2.2.1 The National Intelligence Model (NIM)

In the context of the police reform agenda, the NIM is 'A Model for Policing' that ensures that information is fully researched, developed and analysed to provide intelligence that police managers can use to:

- provide strategic direction
- make tactical resourcing decisions about operational policing
- manage risk.

It is important to note that the NIM is not just about crime and not just about intelligence – it is a model that can be used for most areas of policing. It offers, for the first time, the realisable goal of integrated intelligence in which all forces and law enforcement agencies play a part in a system greater than themselves.

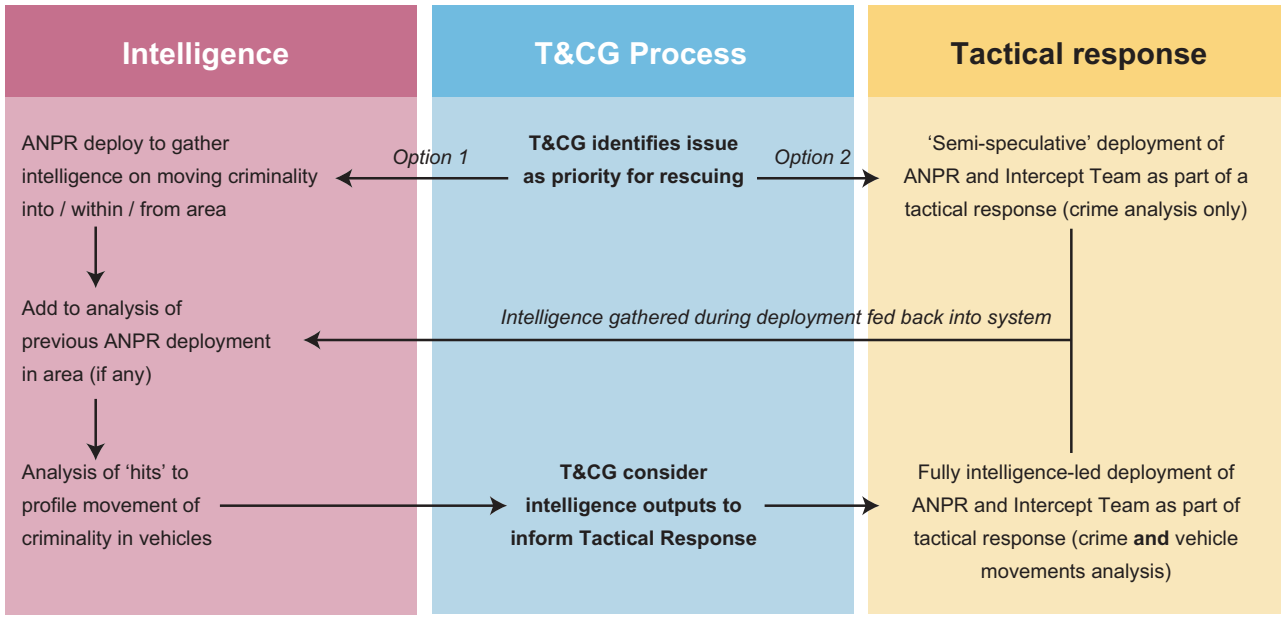
[8] Caroline Flint, DfT press release 11 August 2004

Launched by the National Criminal Intelligence Service (NCIS) and adopted by the ACPO in 2000, the government placed the NIM at the centre of the police reform agenda. The model has been designed to impact at three levels of business: local, cross border and serious and organised crime:

- **Level 1** – Local issues – usually the crimes, criminals and other problems affecting a Basic Command Unit or small force area. The scope of the crimes will be wide ranging from low value thefts through to serious offences such as murder. The handling of volume crime will be a particular issue at this level.
- **Level 2** – Cross border issues – usually the actions of a criminal or other specific problems affecting more than one basic command unit. Problems may affect a group of basic command units, neighbouring forces or a group of forces. Issues will be capable of resolution by forces, perhaps with support from the National Crime Squad, HM Customs and Excise, the National Criminal Intelligence Service or other national resources. Key issues will be the identification of common problems, the exchange of appropriate data and the provision of resources for the common good.
- **Level 3** – Serious and organised crime – usually operating on a national and international scale, requiring identification by proactive means and response primarily through targeting operations by dedicated units and a preventative response on a national basis.

In the context of ANPR-enabled intercept teams, their primary role is to address level 1 criminality, though clearly they have a potential role in tackling level 2 and 3 criminality. For example ANPR units can gather intelligence on vehicle movements and the deployment of intercept teams on strategic roads and could potentially detect and disrupt cross border movement of criminals. PSU have developed a process map of how ANPR contributes to NIM. This is explained in full in the good practice guide and summarised in Figure 2.1 overleaf.

Figure 2.1: How ANPR contributes to NIM



2.2.2 Policing Bureaucracy Taskforce recommendations

The Policing Bureaucracy Taskforce (chaired by Sir David O'Dowd, former Chief Inspector of Constabulary) was established in January 2002 as part of the Government's Police Reform programme to seek ways to increase the presence of uniformed officers in the community by:

- removing the unnecessary burdens borne by front-line staff
- providing adequate support
- revising working practices to enable them to operate more effectively.

The Taskforce report[9] identified that the public wanted to see more uniformed police officers in the community and that front-line officers want to dedicate more of their time to dealing effectively with crime and anti-social conduct and in bringing offenders to book. It also acknowledged that there was a general desire for the police and criminal justice professionals to succeed in convicting the guilty and, in particular, persistent offenders whose activities blight the lives of whole communities.

[9] *Policing Bureaucracy Taskforce Report*, Home Office (17 September 2002)

In relation to ANPR, the Taskforce recognised that ANPR was an extremely useful tool; however it could only be fully effective if sufficient intervention resources, specifically intercept teams, are deployed to respond to a significant proportion of alerts. It recognised that ANPR:

- increased police performance in crime detection
- lead to higher police visibility and citizen reassurance
- could be partly self-funding through cost recovery
- could reduce time spent on paperwork by increased use of FPNs over preparing traditional court files for appropriate offences.

The report made a specific recommendation to develop the use of ANPR.

2.2.3 The Bichard inquiry

The independent inquiry arising from the Soham murders chaired by Sir Michael Bichard investigated a number of issues, including the effectiveness of the relevant intelligence-based record keeping and information sharing with other agencies and between forces.

The inquiry report[10] made a specific recommendation that the Home Office should lead the development of a national information technology system for England and Wales to support police intelligence and that it should be introduced as a matter of urgency. Government has accepted these findings and recommendations in full.

In this context it is important to note that other than for the services provided by PNC, police forces are having to operate with a series of local databases in regard to vehicle intelligence which have to be copied and shared between forces. This is a time consuming and ineffective way of operating and highlights the need for a national data warehouse. This could hold all vehicle intelligence to be read in real time by all ANPR users nationally. In turn, this data warehouse would also hold ANPR reads and hits as a further source of vehicle intelligence, providing great benefits to major crime and terrorism enquiries.

2.3 The ACPO road policing strategy

The national ACPO roads policing strategy[11] presents the use of ANPR as a core activity for the police to detect and respond to criminal activity on the roads:

[10] *The Bichard Inquiry Report,* Sir Michael Bichard, House of Commons (June 2004)
[11] *Modern road policing – a manifesto for the future,* ACPO (November 2002)

"The police have a duty to tackle criminality, in all its forms, including contravention of road traffic law much of which is aimed at poor driver behaviour. We intend to use the police National Intelligence Model to focus enforcement activity in order to detect, disrupt and challenge criminal use of the roads. To do this we will make full use of modern technology, and in particular Automatic Number Plate Recognition systems that have the potential to revolutionise road policing."

To support the development and use of ANPR, ACPO have drafted an ANPR information, intelligence and technology strategy[12]. The vision is to roll-out Laser 2 to all forces such that approximately 2,000 officers are delivering an intercept capability. This sets out how the Police Service will use ANPR, specifically to meet its strategic aim of denying criminals the use of the roads through a national infrastructure of ANPR technology throughout England and Wales. The intention is to back this up by a police intercept team in every Basic Command Unit area.

This strategy identified that every force in England and Wales has ANPR capability and back office facility and shortly this back office facility will enable ANPR data to be transferred between all forces through the secure and controlled environment of the Criminal Justice Extranet (CJX). However the strategy highlighted that while all forces have ANPR equipment, they are using systems from a variety of suppliers. To address this PSU and ACPO have recently prepared and circulated a National ANPR Standards document that details the minimum standards within which police ANPR systems should operate.

This strategy, however, represents the Police Service strategy, and does cover ANPR across Government, which includes DVLA, Customs & Excise, the Highways Agency, VOSA, and ports authorities.

[12] *ANPR information, intelligence and technology strategy,* ACPO (June, 2004)

2.4 The link between vehicle documentation offences and crime

In the UK there is a high-level of non-compliance with vehicle documentation requirements, for example:

- There are over 1.76 million vehicles on the road that do not have a **valid vehicle excise licence** (approximately 5.5% of all vehicles on the road). This evasion costs the HM Treasury (HMT) over £190 million per annum.[13]
- DVLA have **no registered keeper information** for approximately 1.9 million vehicles on the road. Anecdotal evidence from traffic police suggests that where registered keeper information exists, the actual keeper is likely to be different to the registered keeper in at least 10% of cases.
- The Association of British Insurers (ABI) estimates that there are at least one million persons driving regularly while **uninsured**, ie about 5% of all drivers. Accidents involving uninsured motorists cost up to £500 million a year, which ultimately adds approximately £30 a year to each motorist's premium.[14]
- While no statistics are collected, it is believed that around 10% of those vehicles requiring an MOT **do not have a current MOT certificate**.

Following a nationwide police operation to assess the level of non-compliance on the roads, the DfT is expected to publish more information on the above in the autumn of 2004.

2.4.1 There is a correlation between vehicle and traffic offences and other criminality

Historically, police have not focused on these offences for a number of reasons. First, **the offences themselves were not seen to be as important as other volume crime**. However, evidence suggests that there is a strong correlation between vehicle crime and other, more serious, crimes – for example a Home Office study[15] demonstrated the link between traffic offending and general criminality. The study found that of those parking illegally in disabled parking bays:

- 21% of vehicles were of immediate police interest
- 33% of keepers of the vehicles had a criminal record
- 49% of the vehicles had a history of traffic offending
- 18% of vehicles were known or suspected of use in a crime
- 11% of vehicles were in breach of traffic law, eg no VED.

[13] *Vehicle Excise Duty Evasion,* Department for Transport (2002)
[14] *New Research on Uninsured Drivers,* Association of British Insurers (March 2004)
[13] *Illegal Parking in Disabled Bays: A Means of Offender Targeting,* Sylvia Chenery, Chris Henshaw and Ken Pease, Home Office RDS (1999)

These figures are significantly higher than the 'average' vehicle/vehicle driver.

The Home Office has also completed a study of the criminal history of serious traffic offenders[16]. The study examined the extent to which anti-social behaviour on the road was linked to wider criminal activity. It looked specifically at drink drivers, disqualified drivers and dangerous drivers. A finding was that disqualified drivers showed a similar offending profile to mainstream criminal offenders. 79% had a criminal record (72% for mainstream offenders), their levels of previous offending were slightly higher than for mainstream offenders and they were equally likely to be convicted again within a year (37% were reconvicted). Importantly, however, police used prior intelligence in only half of all arrests. This suggested that if police were able to access previous convictions in a timely fashion, this could help more effectively target resources.

An important point that emerged from the study was the level of non-specialisation of offence types – those repeatedly committing serious traffic offences were also likely to commit mainstream offences. The evidence suggests that these offenders **cannot** generally be thought of as otherwise law-abiding members of the public. Even drink drivers (who were less involved in mainstream crime than other serious traffic offenders) were estimated to be twice as likely to have a criminal record as members of the general population. When serious traffic offenders were reconvicted, there was a tendency for repeat serious traffic offending (especially disqualified driving) although this was in a context of more generalised criminal offending.

Recent research by the insurance industry evidences the strong link between serious motoring offences and the one million motorists driving without insurance[17]. Specifically, compared to drivers with insurance, uninsured drivers are:

- ten times more likely to have been convicted of drink driving
- six times more likely to have been convicted of driving a non-roadworthy vehicle
- three times more likely to have been convicted of driving without due care and attention.

Finding 2. There is substantial research evidence to suggest that the pursuit of vehicle documentation offences will lead to more serious crimes being detected.

[16] *The Criminal History of Serious Traffic Offenders,* Gerry Rose, Home Office RDS (2000)
[17] *New Research on Uninsured Drivers*, Association of British Insurers (March 2004)

2.4.2 Scarce police resource is being stretched

A second reason why vehicle documentation enforcement has not been a police focus has been the **significant resource constraints upon traffic police**, ie those officers who would normally undertake vehicle documentation enforcement. For example, a study published in 2003[18] estimated that less than 6% of police personnel are dedicated to traffic and vehicle duties. In spite of an increase in traffic volume (8% increase between 1997 and 2002)[19] and vehicles (13% increase between 1997 and 2002)[20], the number of designated road traffic police fell by 13% between 1997/98 and 2002/03 to approximately 6,900 officers. An analysis of activity undertaken by these traffic police officers[21] showed that less than 5% of their time was spent on static vehicle checks and vehicle documentation checks – this equates to approximately 350 full time officers across England and Wales[22].

Finding 3. These figures suggest that relatively little police time is spent undertaking proactive vehicle checks and, given the above link between vehicle documentation offences and more serious crime, this appears to be an opportunity lost to address wider criminal issues.

Finally, police have not focused on vehicle documentation enforcement due to the **sheer volume of traffic on the road** – in the UK there are nearly 30 million vehicles currently registered and over 485 billion vehicle kilometres driven on the road network per year[23].

Finding 4. The distances travelled on the UK roads presents a huge logistical problem for police in terms of identifying and filtering out vehicles worthy of stopping.

With the improvements in ANPR technologies and an overall reduction in IT costs, it has been proven that ANPR can address these difficulties and become an effective policing tool[24]. Criminals, like other citizens, need to use the roads and, given the potential of ANPR allied with good police intelligence, when they do so they are susceptible to detection.

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[18] *Roles and responsibilities review Highways Agency/ACPO*, PA Consulting Group (2003)
[19] *Road traffic: by type of vehicle:* 1992-2002, DfT (2004)
[20] Ibid
[21] *Roles and responsibilities review Highways Agency/ACPO*, PA Consulting Group (2003)
[22] While vehicle document checks may be undertaken by ordinary officers, no data exists on the volume undertaken
[23] Ibid
[24] *Engaging criminality – denying criminals use of the roads*, PA Consulting Group (October 2003)

2.4.3 The public want more action taken against illegal drivers

In terms of public perceptions, surveys of motorists reveal strong support for action against documentation offences. For example a recent survey found that:[25]

- three quarters of people surveyed are worried about the number of uninsured drivers on the road
- more than nine out of ten (97%) people urged the Government to do more to tackle this problem
- in terms of specific actions against uninsured drivers:
  - a third of those questioned would like to see offenders taken off the road for good with a total driving ban for culprits
  - a third favoured confiscation of the vehicle
  - a fifth would welcome larger fines
  - while a fifth favoured imprisonment.

In terms of industry support, it is interesting to note that in their response to the current Government review of the uninsured drivers, the ABI recommended:[26]

> "We need to see a step-change in enforcement processes, to improve the actual and perceived chances of uninsured drivers being caught. A new modern and cost-effective enforcement process needs to be introduced. . ."

[25] Commissioned by MORE TH>N and conducted by TNS via telephone interview amongst 1,006 GB adults aged 16+ from 11-13 June 2004

[26] *Response of The Association of British Insurers on behalf of Motor Conference and the MIB to The Greenaway Review of Compulsory Motor Insurance and Uninsured Driving,* ABI (February 2004)

Finding 5. There is significant public and industry support for a radical change in the way documentation enforcement takes place, in particular there is support for enforcement to target uninsured drivers. However, a legislative change is needed to allow the proactive targeting of vehicles without insurance (by using intelligence provided by an insurance database). This would also help to increase the productivity of ANPR intercept officers.

Finding 6. There is a major drive within policing to make better use of intelligence, both as a means of targeting resources and to engage with criminality. In the context of this report, it is clear that as an intelligence-led policing tool, the effectiveness of ANPR in engaging level 2 and 3 criminality will be limited by the availability of good quality and timely intelligence.

How Laser 2 APNR intercept teams operate

This section of the evaluation provides more information on how ANPR intercept teams function. In terms of operation, the use of ANPR intercept teams represents a radical approach:

- targeting vehicle documentation enforcement to engage with and disrupt criminals
- delivering through an intelligence-led piece of technology (an ANPR reader)
- benefiting from officers' experience (eg observations of vehicle drivers)
- supported by existing policing processes (eg prisoner handling) [Section 3.1].

ANPR monitoring can be undertaken by a number of means, principally through fixed infrastructure (CCTV systems), within existing patrol cars (in-car systems) or as a dedicated mobile unit. No one method of deployment is significantly more accurate in terms of VRM reads – the key issue is how the police operate the systems to meet local operational targets. It is worth noting that ANPR-enabled intercept teams do not rely solely on ANPR technologies but also use their training, experience and judgement. Vehicles that are not flagged by the ANPR system but are being driven suspiciously can also be stopped [Section 3.2].

In terms of data sources, ANPR can be used with any database that includes reference to a VRM. Within Laser 2, the principal data sources were Police National Computer (PNC), local force information systems and DVLA's databases of vehicles recorded as not having VED or a known keeper.

Programmed improvements to existing vehicle databases (DVLA and PNC) and the development of legislative powers to use other databases proactively (eg motor insurance database) will provide more and better quality intelligence to ANPR intercept teams. With the success of ANPR intercept teams, non-ANPR intercept officers are beginning to supply more vehicle-based intelligence for the ANPR teams to exploit. Most national vehicle databases are or will shortly be available for ANPR intercept teams. While there is still a need to provide this intelligence as part of a national data warehouse, these will allow ANPR teams to be more effective, particularly in stopping those vehicles that appear on a number of databases ('multiple hits') [Section 3.4].

3.1 Introduction

ANPR systems read VRMs from digital images, captured either through in-car systems, closed circuit television camera (CCTV), or a mobile unit (normally mounted in a vehicle). A key feature of all ANPR systems is their speed and efficiency of analysis – the systems are capable of checking up to 3,000 number plates per hour of vehicles travelling up to 100 mph. Individual ANPR units can link up to four cameras and cover several lanes/locations at a time.

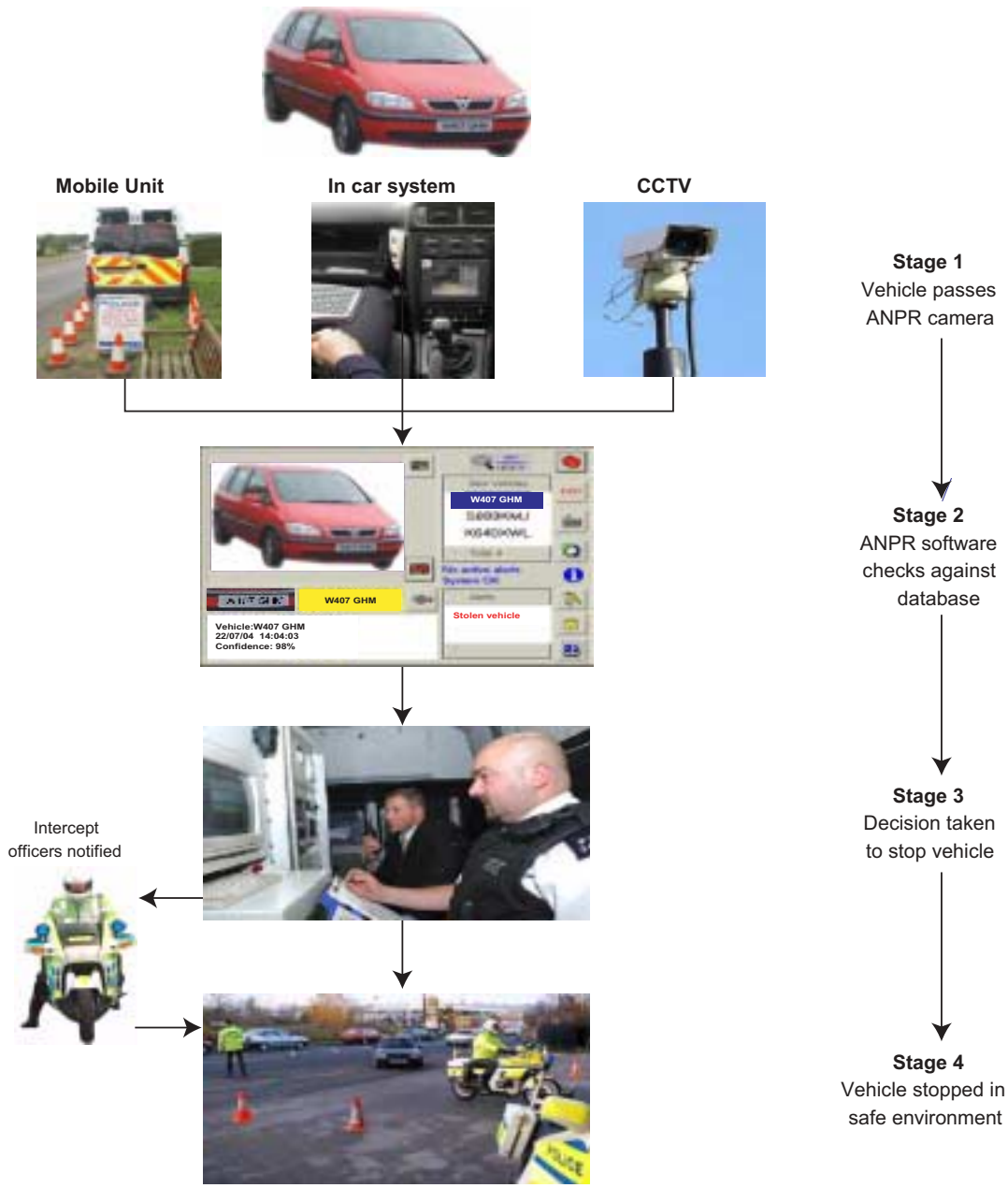
Older systems were susceptible to crude manipulation of number plates (for example using black insulation tape to change an 'F' into an 'E'), and functioned badly in poor visibility conditions. Newer infrared cameras combine the latest software, are much more reliable and are able to accurately read most VRMs – in practice this means ANPR systems are able to correctly read 95 number plates out of 100.

The conversion of an image of a registration plate into text allows this data to be used in a variety of ways including cross-referencing with databases. This process is performed in a fraction of a second. Within a policing context, ANPR can be used to identify vehicles flagged on the Police National Computer (PNC), local Force Intelligence Systems (FIS) or other related databases (eg DVLA or Customs and Excise).

Where there are support resources, action can then be taken immediately – police know where a vehicle is and the direction in which it is travelling. Prior to the introduction of ANPR, the volume of traffic helped to conceal those committing vehicle-related crimes. The use of ANPR and dedicated intercept teams can thus allow police to actively engage with criminality.

An example of how ANPR can be used with intercept teams is shown in Figure 3.1. The vehicle passes an ANPR camera (either in-car, CCTV or a mobile unit). This sends image data to the ANPR system, which 'reads' the VRM and crosschecks it against a database; in this case the PNC and a Force Intelligence System. Where a match is found, the ANPR operator is notified and can decide to call for an intercept vehicle.

Figure 3.1: Use of ANPR to direct intercept teams



The development and increased use of ANPR technology allows for a more focused approach than was previously possible. Officers responding to the ANPR alerts do so in a targeted way using police intelligence with significantly improved chances of detecting offences and disrupting criminals.

It is worth noting that ANPR-enabled intercept teams do not rely solely on ANPR technologies but also use their training, experience and judgement. Vehicles that are not flagged by the ANPR system can also be stopped, based on the professional judgement of the intercept officer.

Apart from the use of ANPR with intercept teams, all other aspects of policing and prisoner handling were as per normal force practice. During the pilot, however, as a result of the effectiveness of ANPR intercept teams, these practices developed. For example, certain forces (eg West Midlands Police and Cheshire Constabulary) made use of dedicated prisoner handling units to support the ANPR intercept team. The intention was to minimise the time spent by ANPR intercept teams in handling prisoners and to maximise their time intercepting. However, for the majority of forces, ANPR intercept teams undertook their own prisoner handling.

Finding 7. Conceptually, the use of ANPR intercept teams represents a radical approach:

- **targeting vehicle documentation enforcement to engage with and disrupt criminals**
- **delivered through an intelligence-led piece of technology (an ANPR reader)**
- **benefiting from officers' experience (eg observations of vehicle drivers)**
- **supported by existing policing processes (eg prisoner handling).**

3.2 ANPR deployment

Not all forces used the same equipment or structure of intercept team during the pilot. In terms of deployment, three approaches were used:

- **Mobile ANPR vehicle with intercept capability** – The majority of pilot forces involved in Laser 2 used a static ANPR vehicle, normally a van, operated in conjunction with dedicated marked mobile police resources, most usually marked motorcycles. The ANPR van was normally parked at the side of the road, in a lay-by, verge or central reservation. Motorcyclists were then deployed approximately 250 metres further down the road to stop vehicles of interest.

- **In-car systems** – This form of deployment was based around individual patrol vehicles fitted with ANPR operating without back-up intercept support – the officers in the vehicle would stop vehicles of interest. However, when a vehicle was stopped, the officers operating the ANPR equipment would be 'tied up' with an enquiry and hence the ANPR reader would not be fully exploited. This method was seen as relatively inefficient means of operation and hence none of the forces used this as a primary means for deployment
- **CCTV** – Some forces also used ANPR readers linked to existing public space CCTV systems and used dedicated intercept teams to follow up on vehicles of interest. For this deployment, the CCTV control room (situated on local authority premises for ease of access to the CCTV camera matrix) handles the incoming video source. Number plate details are then sent via a data link to the processor unit within the police control room where the relevant databases are situated so a match can be made. The fixed nature of ANPR links to CCTV enable it to have a live fast track access to the PNC, allowing access to the most current information. The police controller is informed which vehicle is of interest and the intelligence report that has identified it. An ANPR intercept team is then despatched to vehicles that are identified in this way.

Finding 8. ANPR deployment can be undertaken by a number of means, principally through fixed infrastructure (CCTV systems), within existing patrol cars (in-car systems) or as a dedicated mobile unit. No one method of deployment is significantly more accurate in terms of VRM reads – the key issue is how the police operate the systems to meet local operational targets.

Some forces based their ANPR operations on the force tasking and co-ordination process in accordance with the National Intelligence Model. This is evolving, but to ensure that ANPR is deployed appropriately, proper consultation regarding selection of suitable venues is undertaken with the team supervisor. Those locations where there are high levels of crime and high volumes of traffic flow are considered. High volume roads are also typically high visibility, leading to greater public reassurance, though these roads do not always make the most appropriate intercept locations.

This is not to say that ANPR cannot be deployed where the volume of traffic is lighter. Consideration has to be given to the location, the number of vehicles passing through the area, the number of target vehicles likely to be encountered and where there is specific intelligence to indicate that its deployment would be beneficial. The time of day may also influence the number of vehicles stopped – this is discussed in section 5.3.5 below.

The speed of traffic can make interception more difficult and can determine whether or not pursuit situations occur. In identifying locations for intercept, effort is made to ensure smooth traffic flow and consideration should be given to likely disruption, particularly busy commuter thoroughfares. For example, fixed CCTV may be more effective for motorway junctions (especially where they are linked to arterial roads), service areas (where vehicles will come to a halt) and bridges where the capacity for greater intelligence gathering exists.

The nature of the operation can dictate the size of location for intercept. For example, smaller operations may utilise roadside lay-bys, whereas larger operations, involving other agencies, may require a much larger site to operate safely (such as a shopping centre car park).

3.3 ANPR data sources

ANPR can be used with any database that includes reference to VRM. In a policing context, the most obvious data source is the PNC. Within PNC, there are two main indexes, namely Vehicles and Criminal Records. The Vehicles Index houses 50 million records, containing full descriptive details of vehicles and, where known, their registered keepers. The vehicles index includes both:

- **Reports**, which are based on specific police intelligence. As of the 1 July 2004 there were approximately 936,000 vehicles reported on PNC as follows:[27]
  - 551,767 lost/stolen
  - 41,653 removed
  - 80,654 information
  - 45,001 corrected
  - 26,633 found
  - 171,658 destroyed
  - 4,167 seen/checked
- **Markers**, which are based on data supplied by third parties, for example the DVLA. There are approximately eight million markers for a wide range of possible vehicle documentation offences including ‘no registered keeper’ and ‘no valid vehicle excise duty’.

In terms of ANPR usage, reports are held in the ANPR system for immediate access, while markers are accessible only when a standard vehicle check is carried out. For many intercept officers, information on PNC markers will, therefore, only be available through an enquiry to their control room. For this reason most forces equip their ANPR systems with information supplied direct from DVLA on vehicles which have no vehicle excise duty or where there is no registered keeper as a separate ANPR database.

[27] Police Information Technology Organisation (PITO)

It is worth noting that during March 2004 DVLA had technical problems producing the 'No current keeper' and the 'No VED' databases. Forces typically received updates of these databases monthly, thus during this period, forces were using increasingly dated data sources that would have been significantly less accurate – this is reflected in the performance of these databases as can be seen in section 7. In fact many forces chose not to use these databases due to these issues.

In addition, most forces also use local intelligence databases with ANPR, for example the registration marks of those vehicles:

- that have been recorded speeding but have failed to respond the Notice of Intended Prosecution
- belonging to recently disqualified drivers.

Forces use the data as a means of positive inclusion, that is where a VRM is matched with a specific marker on the database, then the vehicle is stopped.

Finding 9. The current intelligence databases do not allow ANPR readers to identify 'ghost' VRMs, that is false GB VRMs that have never been issued by DVLA.

Finding 10. Currently, ANPR teams operate as discrete operations with no cross-referencing of VRM reads either within or between forces.

3.3.1 Future enhancements

The above finding has been recognised by ACPO and the Home Office and they are currently seeking to develop a national vehicle intelligence database. This would allow all forces to work in real time with the same information, would include all vehicle hits and would be available Nationally rather than held in individual forces.

In terms of further future developments, enhancements to the driver and motor insurance database within PNC will also provide patrolling officers at the roadside with information on drivers' licence entitlement and their insurance status. Currently drivers have to produce their documents at a police station of their choice within seven days (HO/RT/1). In future officers will able to request a PNC check through the police control room to find out, in most cases, whether the motorist before them is insured or has the right licence entitlement to be behind the wheel. Legislation is still needed to support the pro-active use of this information.

A key issue in relation to any roadside stop is driver identification. There is currently no requirement for drivers to carry identification or a driving licence. While many drivers do carry some form of photographic identification, many do not (and often it is those that do not that are of most interest to the police). In practice this means that any officer stopping vehicles at the roadside may have to take an individual to a police station in order to validate their details. In order to address this, PITO are developing a roadside fingerprint capability to assist ANPR teams with the identification process.

3.3.2 Continuous registration, MOT and motor insurance databases

In the context of this evaluation it is worth noting that from 1 February 2004 DVLA have been enforcing 'continuous registration'. Specifically vehicle keepers who fail to re-licence within eight weeks following the expiry of the old licence are now being sent a letter stating that they have committed an offence for which a fine is payable and requesting that the keeper either re-licenses their vehicle or declares the vehicle off road (Statutory Off-road Notification – SORN). While it is too early to evaluate the impact of continuous registration, in the context of this evaluation it is worth noting the potential effects:

- increasing the overall level of VED compliance (through a better process and associated communication), thereby reducing potential fine revenue for the ANPR intercept teams
- increased accuracy of the no VED and Current Keeper databases.

The computerisation of the MOT database is due to go live late 2004. This will give police officers roadside access to information on the MOT status of a vehicle in a similar way to the drivers and motor insurance database. In addition, an automatic flagging system will eventually be introduced to alert police each time a stolen vehicle is taken to a testing station for an MOT .

It is expected that the drivers and motor insurance database, continuous registration and the MOT database will dramatically cut the number of traditional document productions at the police station and reduce the paperwork burden on the police. Giving officers the tools to check driving licence, motor insurance and MOT details at the roadside will also make life easier for the honest motorist who, in most cases, will no longer have to visit a police station with their papers.

Finding 11. Improvements to existing vehicle databases (DVLA and PNC) and the development of new databases (MOT and motor insurance) will provide more and better quality intelligence to ANPR intercept teams. With the success of ANPR intercept teams, non-ANPR intercept officers are beginning to supply more vehicle-based intelligence for the ANPR teams to exploit. These new databases will shortly be provided for ANPR intercept teams – these will allow ANPR teams to be more effective, in particular stopping those vehicles that appear on a number of databases ('multiple hits').

3.4 When a stop occurs

Following a vehicle stop, an intercept officer will question the vehicle driver and/or passenger(s) and where appropriate inspect the vehicle. Following this, the intercept officer can take a number of actions including:

- **Vehicle/person search** – an officer may decide that the vehicle or individuals in it should be searched.
- **Recovery of property** – the search of a vehicle/person can often lead to the recovery of stolen goods, drugs or even the vehicle itself.
- **Arrest** – whereby an officer arrests an individual in relation to an offence.
- **Reported for summons** – where an individual was reported to appear in court in relation to minor offences (normally motoring) where a fixed penalty was not appropriate or the offence was too serious (for example four tyres with insufficient tread).
- **Issuing a fixed penalty** – these can be issued for a variety of vehicle/driving offences, such as contravening directional signs, driving without wearing a seatbelt or using a mobile phone while driving. The recipient is issued with a ticket that requires them to pay a fine and, where appropriate, provide their driving licence for endorsement. The police forces in Laser 2 were able to use the issue of a small number of tickets (see Appendix D) for cost recovery. This is covered in section seven of this report.
- **Issuing a note requiring follow-up action** – these include:
  - HO/RT – which requires a driver to present their driving licence and motor insurance details to a local police station within seven days. This is also linked to the issue of conditional offers for the offences of driving without insurance and no MOT .
  - CLE2/6 and CLE2/7 – no current excise offence report to DVLA used for all vehicles.
  - CLE2/8 and V62 – no current vehicle excise offence combined with failing to notify current keeper offence. V62 is application for registration document only.

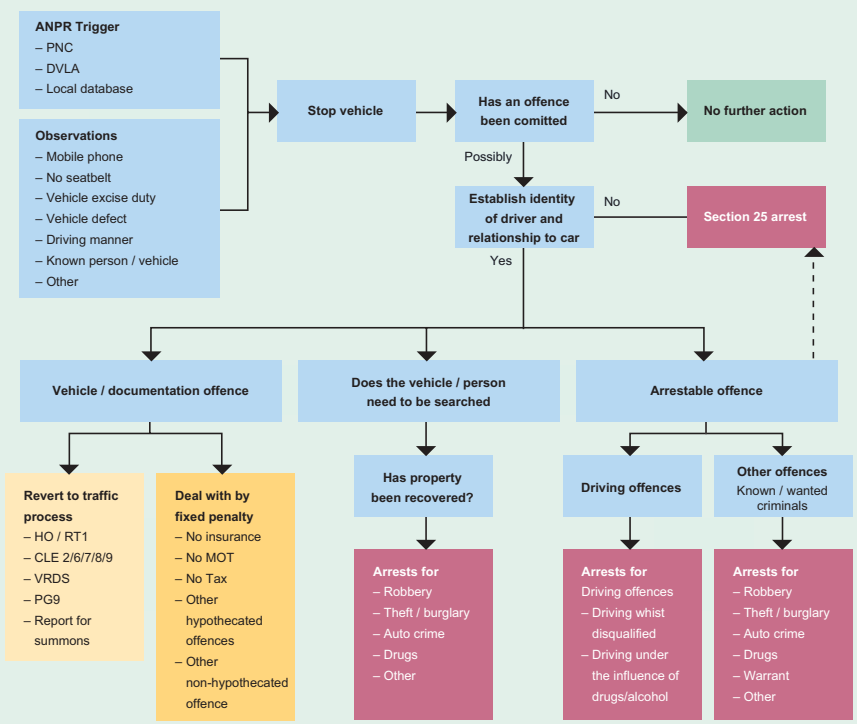
– VDRS – Vehicle Defect Rectification Scheme (notice to offender to carry out repairs to defect within 14 days and have repair certified or face court proceedings).

– PG9 – vehicle prohibition notice, prohibiting the use of the vehicle on the road due to its defective state and requiring a full MOT to be undertaken prior to reuse on road.

- **Intelligence log** – an officer may decide that during a vehicle stop they have uncovered information that should be shared with other officers/forces, for example who was driving a vehicle or who the passengers were. In this case the officer fills in an intelligence form and sends it to the local intelligence officer.
- **No action taken** – where no offence has been committed or the police consider there is insufficient evidence to prosecute or that an informal warning may be sufficient.

Figure 3.2 shows the high-level process for how these outcomes are arrived at.

Figure 3.2: How stops are dealt with



The possible outcomes for an ANPR intercept team vehicle stop are, in principle, the same as for any vehicle stop. However, as will be shown in the following Sections, ANPR stops lead to a large volume of arrests being made and fixed penalties issued.

Findings: Operational factors

The level of ANPR intercept activity is broadly a combination of the number of ANPR intercept teams operating and the size of these teams. This section of the evaluation looks at issues relating to the resourcing of the ANPR intercept teams, what skills and support these teams had and how they decided on where to deploy their resources [Section 4.1].

During the course of the 13 month Laser 2 project, total staff input was 368,446 hours – this equates to 192 Full Time Equivalents (FTEs), the majority of whom were police constables. By the start of the second year of Laser 2 there were approximately 515 working as part of ANPR teams [Section 4.1].

The force returns showed that the majority of ANPR officers' time (77%) was spent either on intercept duties or travelling to and from intercept duties. This is significantly higher than a 'typical' police officer – a Home Office report identified that on average a typical police officer spends only 57% of their time away from their police station. Further, ANPR intercept officers, whether travelling to and from intercept sites or undertaking intercepts, are highly visible and can respond to incidents as and when they occur. Accepting that there are clear differences between the work undertaken by ANPR intercept officers and conventional policing, the operation of ANPR-enabled intercept teams provides for an extremely visible form of policing [Section 4.1].

All forces adopted similar staffing structures for their intercept teams – a core team of intercept officers, lead by supervisor/team leader with appropriate back office support. There was, however, significant variation in the number of intercept officers operating per team, reflecting different operational practices. Forces also recognised the need to appropriately support the operations of ANPR intercept teams, in particular of providing good central support and intelligence [Section 4.2].

A key aspect to the successful exploitation of ANPR intercept teams was senior officer commitment – this ensured that resources were available as and when required and other officers across the force provided appropriate intelligence for the ANPR teams to operate [Section 4.2].

4.1 ANPR staff inputs

4.1.1 ANPR Staff

The level of ANPR intercept activity is broadly a combination of the number of ANPR intercept teams operating and the size of these teams. During Laser 2, the number of teams and staff assigned to these teams was not static, it changed according to local operational conditions and needs and evolved work practices. In particular, for those forces that were new to ANPR, it took some time to recruit and train the teams and set in place the processes to support Laser 2.

Going into the second financial year of Laser 2 in April 2004 (ten months into Laser 2 and a relatively stable state), there were approximately 450 front-line staff and 70 back office support staff assigned to 57 teams across the 23 forces, as shown in Figure 4.1.

Figure 4.1 shows that some forces operated quite a large number of teams but involved relatively few officers in each of them (Cleveland had dedicated an average of 7 ANPR staff per intercept team) while others operated relatively few teams, but involved large numbers of officers in these teams (eg the West Midlands with 17 ANPR staff per intercept team), reflecting different operational tactics and local staffing issues.

Figure 4.1: Number of ANPR teams and staff operating as part of these teams

Force	ANPR teams	Front-line	Support	Total Staff	Persons per staff
Avon & Somerset	3	27	1	28	9.3
Cambridgeshire	2	18	2	20	10.0
Cheshire	1	14	5	19	19.0
City of London	1	7	3	10	10.0
Cleveland	1	7	2	9	9.0
Greater Manchester	3	21	1.5	22.5	7.5
Hampshire	1	24	2	26	26.0
Hertfordshire	3	22	8	30	10.0
Kent	2	14	3	17	8.5
Lancashire	6	40	3	43	7.2
Leicestershire	2	18	2	20	10.0
Lincolnshire	2	16	6	22	11.0
Merseyside	1	8	1	9	9.0
Metropolitan	10	41	9	50	5.0
North Wales	2	21	6	27	13.5
North Yorkshire	1	8	1	9	9.0
Northamptonshire	4	31	2	33	8.3
Northumbria	1	6	2	8	8.0
Nottinghamshire	1	10	3	13	13.0
Staffordshire	2	20	1	21	10.5
Warwickshire	5	27	1	28	5.6
West Midlands	2	33	3	36	18.0
West Yorkshire	1	12	2	14	14.0
Total / Average	**57**	**445**	**69.5**	**514.5**	**9.0**

4.1.2 Resources directly associated with ANPR activity

To understand the total resource devoted to ANPR and how intercept teams were spending their time, each force was asked to provide an estimate of the hours spent on the project per week by grade (Inspector, Sergeant, Constable or civilian staff) for each week of the pilot under a number of categories:

Note: As supplied by forces as part of their operational cases for April 2004.

- **intercept duties** – time when officer is on intercept duty. This includes all those involved in ANPR intercept, eg intercept officers, mobile ANPR unit/CCTV operators, roadside interviewers, back-office PNC checkers (such as force intelligence officers) etc
- **non-intercept duties** – time out on ANPR deployment but not on, or ready for, intercept duties (eg travelling time to location of operation and break times)
- **prisoner handling time** – time from point of arrest at the roadside to point of booking in or handing over to another officer
- **administration** – time spent on data input and other ANPR-related administration such as setting up the operation, databases, systems and resource allocation.

This is not an exhaustive list of the tasks that ANPR staff were involved in. For example other non-ANPR duties that officers undertook but which were not incorporated in the above list included:

- general administration
- case preparation/court attendance
- training and leave
- emergency and special operations.

This list, however, does provide some insight into the level of effort that was required for the different key tasks as well as giving an indication of the kinds of overheads that were part of an ANPR operation. In week 24 of the pilot, forces were also asked to record the number of hours of intercept support that they received from units other than those dedicated to ANPR operations. This included Armed Response Vehicle (ARV) support and dog handlers.

Finding 12. During the course of the 13 month Laser 2 project, total staff input was 368,446 hours – this equates to 192 Full Time Equivalents (FTEs) on the basis of 1,920 operational hours per annum.

This figure is significantly less than the 514.5 quoted in Figure 4.1 above due to abstractions (ANPR intercept officers and staff undertaking duties not directly associated with Laser 2). Throughout this report, FTE has been used as a baseline measure of input. This approach enables us to look at the relative productivity of forces' ANPR intercept teams during their active periods.

4.1.3 Resources directly associated with ANPR activity, over time

During Laser 2, ANPR operations took place on 5,010 days across the 23 forces – this equates to approximately 202 days per force per annum during which an average of 8.3 FTEs were deployed per operational day per force. Figure 4.2 shows the average number of days the ANPR intercept teams were working per force area and the total hours worked per week.

Figure 4.2: Number of days ANPR teams were operational/total hours worked by week

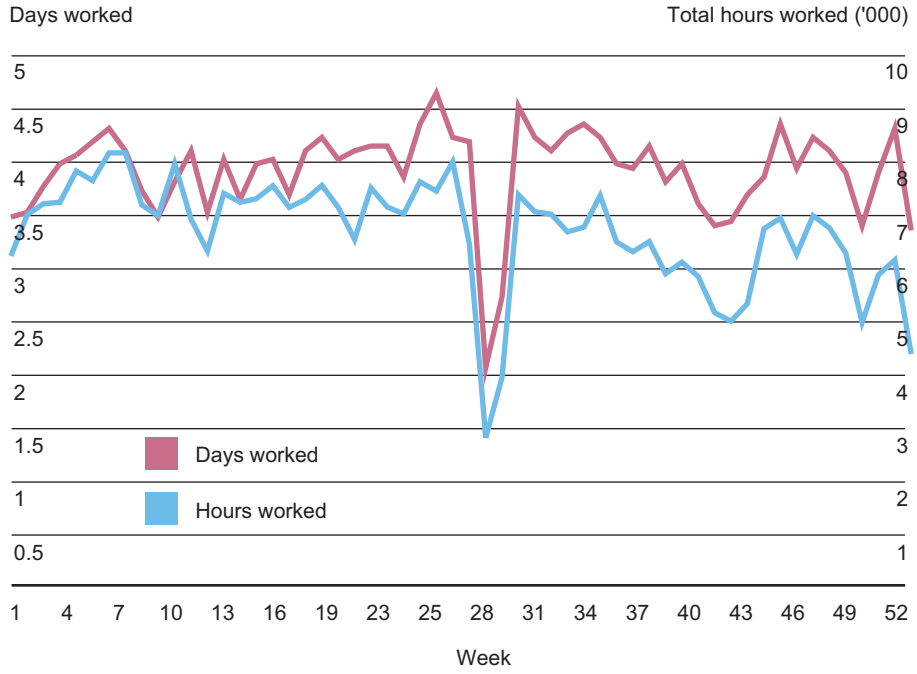


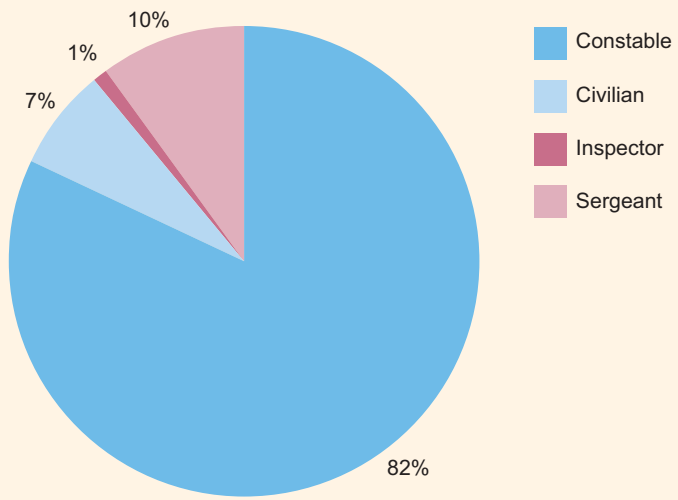
Figure 4.2 shows:

- the average number of days worked and hours worked per week were closely related
- that there was a gradual ramp up of resources in the first month of the pilot
- a significant drop in the average number of days worked during the Christmas period (weeks 30 and 31) and also towards the end of March – weeks 40-44. This corresponds with the end of the police leave year and school Easter holidays
- a fall in the number of hours deployed towards the end of the evaluation. This also occurred in Laser 1 and was due in part to forces not submitting data by the end of the evaluation period
- overall, the number of days worked per team was approximately four days per week – this was broadly similar to Laser 1 during the pilot.

4.1.4 Staffing of ANPR teams

Figure 4.3 shows the proportion of time spent on ANPR duties during Laser 2. The most significant staff input to the pilot by grade was by constables (82% of resource input and 300,581 hours). These findings are broadly similar to Laser 1, where 84% of resource input was from Police Constables.

Figure 4.3: Percentage time spent by staff grade



Finding 13. On the basis of the information provided by forces, the average force staffing for ANPR operations was 0.92 FTE inspectors/sergeants, 6.8 FTE constables and 0.6 FTE civilian staff. On the basis of standard annualised running costs (including staff overhead costs), the cost of staffing the pilot was approximately £6.7m over the 13 month period.

4.1.5 Activities undertaken by the ANPR teams

In total, 197,554 hours were spent during the 13 month Laser 2 project on active intercept duty with an average of 42 hours of intercept time per operational day (86% of which was constable input, with the remainder sergeant/inspector input). A further total of 87,717 hours was spent on non-intercept duties (travelling to/from the intercept site and taking breaks).

This figure varies significantly force by force, with Avon and Somerset and Lincolnshire spending over 40% of their deployment time travelling to and from sites, while Cleveland only spent 17% of their deployment time travelling. This reflects both geography and operational set-up. For example, Avon and Somerset operate force-wide ANPR teams and therefore need to travel large distances to some of their most productive areas. Other forces, for example Cleveland, cover a much smaller area and consequently travel times are much less.

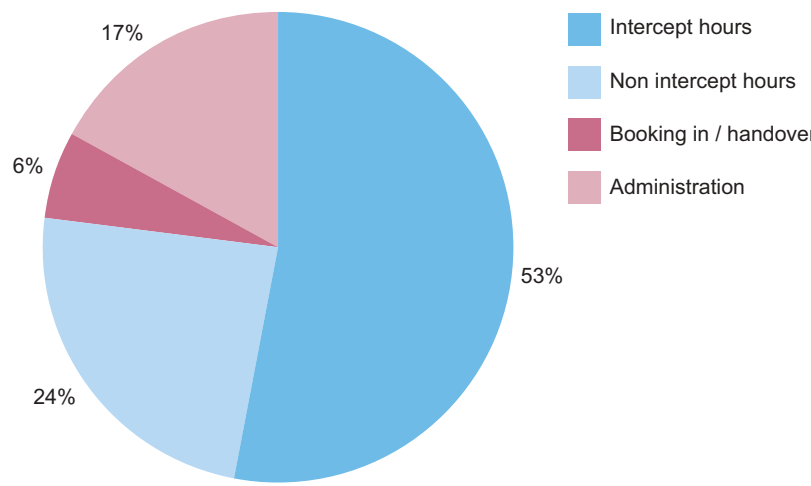
A total of 22,731 hours was booked to Laser 2 to prisoner-handling. During this time, there were 13,499 arrests by the intercept teams, ie each arrest required approximately 1.7 hours of processing time (which would include travel time back to the station).

However, some forces were able to deploy special prisoner handling units, which were able to hold prisoners at the stop site until there were sufficient numbers to drive them all to a custody station. For example in the West Midlands, Operational Command Units (OCUs) bid for the ANPR intercept teams to operate in their area. In return, they committed their OCU to providing a minimum of 8 prisoner handlers and custody facilities – this appears to improve the effectiveness of the ANPR team.

The administrative requirement (which included both civilian and officer time) for the intercept teams was 60,443 hours – equivalent to 1.4 full time members of staff per force, focused solely on the administrative duties of ANPR.

Figure 4.4 shows the majority of time was spent by intercept teams in 'intercepting', with the remainder being spent on travel to sites/breaks (24%), administration (17%), and prisoner handling (6%). Civilian support (4% of deployment effort) was primarily used in the control rooms or mobile ANPR vans, to run checks on number plates and dispatch officers to intercept specific vehicles.

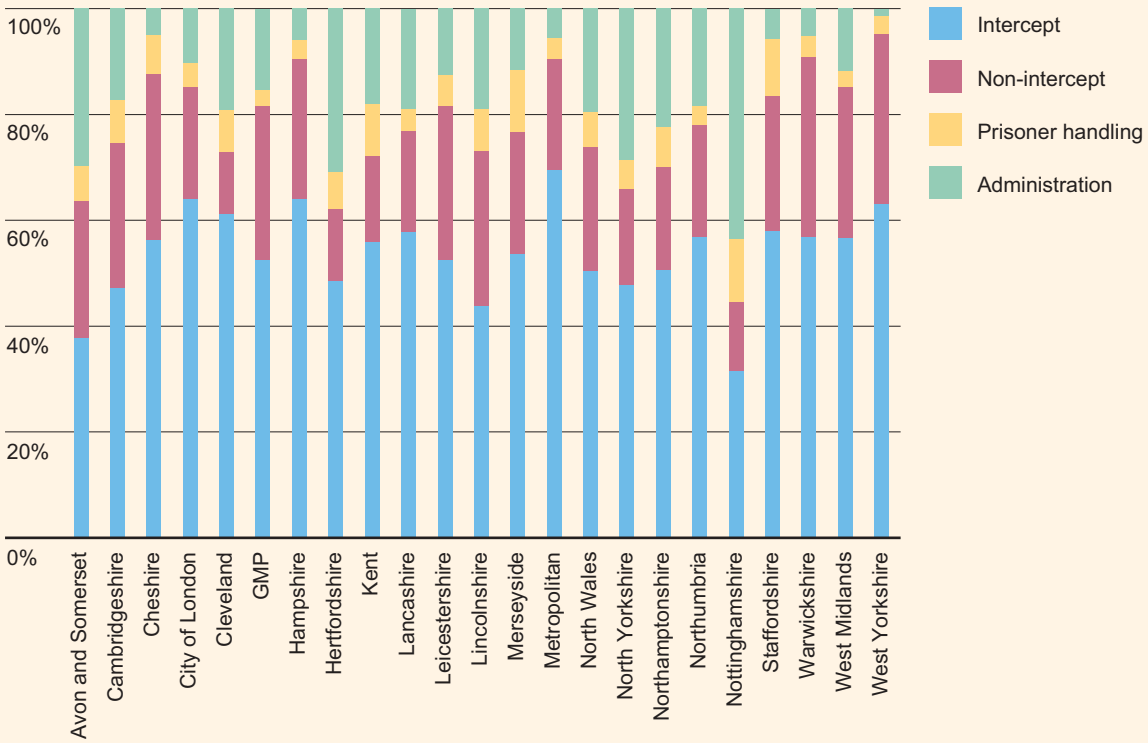
Figure 4.4: Percentage time spent by operational area/staff grade



The force returns showed that the majority of ANPR officers' time is spent either on intercept duties or travelling to and from intercept duties (77%). This is significantly higher than a 'typical' police officer – a Home Office report identified that on average a typical police officer spends only 57% of their time away from their police station. Further, ANPR intercept officers, whether travelling to and from intercept sites or undertaking intercepts, are highly visible.

Finding 14. Accepting that there are clear differences between the work undertaken by ANPR intercept officers and conventional policing, the operation of ANPR-enabled intercept teams provides for an extremely visible form of policing.

Figure 4.5: Percentage time spent by operational area/staff grade



In terms of activity, the proportion of time spent on intercept duties will be a factor in determining the number of arrests and actions taken by the intercept officers. Figure 4.6 shows the average proportion of time spent on intercept duties across the 23 forces.

[29] Diary of a Police Officer, PA Consulting Group (2001)

Figure 4.6: Proportion of time spent on intercept duties by week

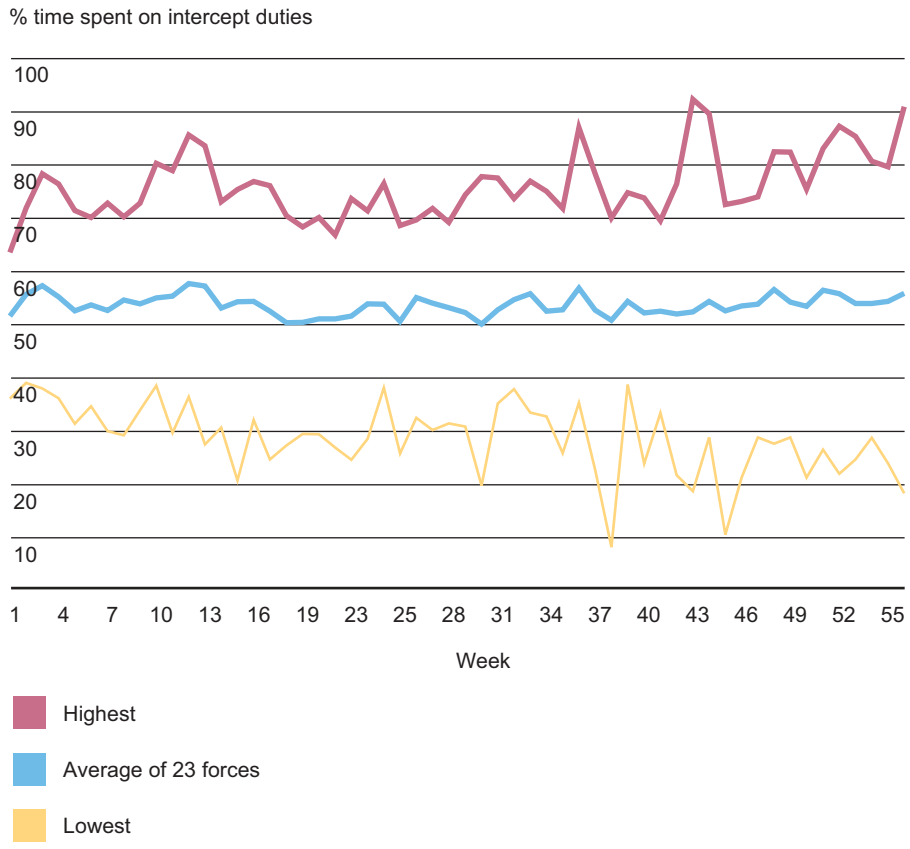


Figure 4.6 also shows the most and least time spent on intercept duties of any the 23 pilot forces for each week. No force spent consistently the most or least time on intercept duties. Overall, the average time spent intercepting stayed broadly consistent through Laser 2.

Finding 15. In any week, the difference between the most and least time spent on intercept duties varied considerably (at times over 75%) and was considerably higher than Laser 1 (where there was relatively little variation). On average, however, the proportion of time spent on intercept duties stayed broadly the same throughout the pilot and was similar across the 23 forces.

4.2 Team capabilities and support

4.2.1 ANPR team make-up

In terms of staff capabilities, ANPR supervisors/managers recognised the need for a wide skills base within intercept teams:

> "Ideally an ANPR team should be made up of officers with a broad range of skills. Traditionally ANPR has been located within a Roads Policing environment because the interception of vehicles requires tactical stopping and pursuit expertise, together with higher than average standard of police driving qualifications. However, the nature of the interaction with the vehicle occupants, once stopped, requires a high level of investigative training and experience. To this end it is useful if the team is also made up of officers with a history of criminal investigation, intelligence handling or search training. This variety adds to the efficiency and effectiveness of ANPR as a tactical tool and enhances the operational performance."[30]

Typically, an ANPR intercept team consists of the following personnel:

- a team supervisor, normally a sergeant, who would manage the ANPR team and co-ordinate with other ANPR teams and other officers within their force. They also have a role in liaising with other ANPR forces (both Laser and non-Laser) in the discussion and adoption of good practice. Supervisor skills include:
  - leadership and communication skills, including drive and motivation
  - operational and strategic planning
  - good knowledge and experience of police powers, roads policing, crime and general policing duties.
- a team of between four and six experienced constables. Their role would be to stop vehicles either identified by the ANPR unit or through observation, eg to identify those vehicles where a driver was using a mobile telephone or not wearing a seatbelt. They would operate in a highly visible, overt fashion. Their skills base would include:
  - team working
  - proactive decision making
  - trained in investigative interviewing
  - qualified standard/advanced driving
  - trained in drugs recognition
  - trained in field impairment
  - trained in safe search techniques.

[30] Nick Purdie, Northamptonshire Police

- an analyst (in most cases civilian), who would be responsible for providing back office support to the ANPR team, collating data on the number of ANPR hits, actions taken and the results, helping prepare files for prosecution, and collating Fixed Penalty paperwork for transfer to the central ticket office. This role would allow the intercept officers to maximise their time spent intercepting. Analyst skills would include:
  - database management experience/training
  - decision making
  - ability to multi-task
  - local knowledge
  - control room experience.

Finding 16. All forces adopted a similar staffing structure for their intercept teams – a core team of intercept officers, supported by administrative support and led by supervisor/team leader. There was, however, significant variation in the number of intercept officers operating per team, reflecting different operational practices.

Examples of operational deployments are described in the following case studies.

Case study 1: ANPR deployment by West Midlands Police

The West Midlands ANPR team typically operates using stop sites staffed by large numbers of people (20+), a strategy that has served the force well in the past. While this requires considerable commitment from OCUs, good results (and internal publicity in relation to these results) have helped increase demand for the centralised ANPR resource. In return for an OCU's commitment to providing good crime analysis, a clear objective for each check, a minimum of eight prisoner handlers and custody facilities, the ANPR team supplies a sergeant, eight motorcycle-based intercept officers, a double-crewed pursuit traffic car, an ANPR vehicle and operator, a communications vehicle including Force Linked Intelligence System (FLINTS) and a site manager. They also use traffic wardens to issue FPNs where this has been identified by the intercept officer as appropriate.

In terms of maintaining morale, checks are for a short, set period – this proved both popular and productive. Further intercept officers are regularly rotated between various tasks on site. As operations are carried out across the 21 OCUs, they only have to provide arrest teams on average once per month, and these are invariably different staff on each occasion.

Case study 2: ANPR deployment by Lincolnshire Police

Lincolnshire Police has two intercept teams dedicated to ANPR, with a sergeant and six officers on each team. All of the ANPR officers originate from the Roads Policing Unit, all are pursuit trained and the majority are also motorcyclists.

The teams are, on the whole, self-sufficient. They are deployed in accordance with the National Intelligence Model to areas selected from the BCU Tasking and Co-ordinating Group (T&CG) meetings. Where possible they make use of Divisional Prisoner Handling Units whenever arrests are made, but often the arresting officer has to interview and process the prisoners themselves. This is obviously detrimental to performance.

4.2.2 Supporting ANPR teams

In addition, most ANPR intercept teams (17 of the 23) received some form of additional support from their force at some point during the pilot. In total, 12,000 hours were recorded as support. This is on average 42 hours of support per week (or 32% of the dedicated team's intercept time). This support included:

- controllers – to provide ANPR teams with checks on people and vehicles stopped (PNC/local intelligence etc), and to deploy team members to ANPR activations
- ANPR technicians – to offer IT support and expertise to operational teams and to develop future IT solutions
- database managers – to develop, collate, analyse and manage intelligence sources and to create, audit and manage information databases. To act as a liaison point with other departments, forces and agencies. To share intelligence, information and target profiles (eg people, vehicles and locations)
- analysts – to collate and analyse crime patterns and intelligence for ANPR use and to inform the operational deployment of ANPR teams
- media/publicity personnel – to manage media interest. This was particularly relevant given the high profile nature of ANPR intercept teams.

Finding 17. Forces recognised the need to support appropriately the operations of ANPR intercept teams, in particular to provide good central support and intelligence.

4.2.3 Senior officer commitment

As well as resources, many ANPR project managers recognised that the level of support received from Chief Officers was vital:

> "The experience of the Police Standards Unit has emphasised the importance of ACPO involvement in the strategic direction of ANPR at force level. It is very easy for forces not to support ANPR in the face of the competing demands of reactive policing and so fail to deliver the potential increases in performance that ANPR has shown that it can produce. Active leadership by an ACPO officer, driving delivery through a performance culture and the adoption of a project structure, involving the major in-force stakeholders, continues to be one of the most efficient and effective ways of maximising the performance potential of ANPR."[31]

Examples of instances where there was direct intervention at Chief Officer level include:

- Northamptonshire, where Chief Officer support led to development of and support from partnerships with the local council (the CCTV set-up)
- West Midlands where support came in the form of BCU aid at ANPR stops
- North Wales where the support of the Chief Constable was seen as key in driving the team.

Finding 18. Senior officer commitment to the programme was seen as critically important.

4.3 Location deployment

4.3.1 Means of deployment

The most common deployment method was the mobile ANPR vehicles (both vans and in-car systems) with intercept support provided by a combination of motorcycles and cars. While motorcycles provide a valuable high-speed response in congested urban areas, they cannot work without car support (for example, to transport prisoners).

Furthermore, health and safety assessments have shown that motorcycles are more vulnerable and ACPO guidelines prohibit them from engaging in pursuits. Finally, they are less popular with intercept officers in poor weather conditions.

[31] Alan Ford, PCU

4.3.2 Location of deployment

Another key aspect to successful ANPR operations was selecting the most suitable locations, reflecting a range of competing factors, specifically:

- the maximisation of operational performance – for ANPR to be most effective, it should be deployed in areas where the chance of encountering criminality is most likely. However, a number of locations are used to ensure that criminals do not become aware of where the ANPR units are likely to be deployed
- ensuring that officers operate in a safe manner and vehicles are stopped within a controlled environment. The safety of the intercept team, the vehicle occupants and the general public is paramount and it is vital that this be taken into account prior to selecting a suitable stopping area.

In terms of good practice in selecting an appropriate location for a mobile ANPR and intercept team, the following catalogues the key stages:

- a pattern analysis identifies hot spots of crime and when these are occurring, for example housebreaking on the south side of the city in the mid-morning
- profiling is then carried out by relevant OCUs/BCUs to identify areas where offenders are likely to be travelling from and, from this, the likely routes they take
- the traffic intelligence officer liaises with local traffic units and beat officers to identify potential ANPR intercept locations on likely routes. A database of previously used locations is referred to, together with the results from previous ANPR deployments. This allows productive locations to be easily identified. In addition, new sites are visited and risk assessed for suitability. If needed, traffic flows are measured in advance to assist with site intelligence. The ANPR team have the final say on suitability of a site unless directed from level 2 tasking, as described in Section 2.2.1 above.
- prior to deployment, the local OCU/BCU is contacted to ensure that all relevant intelligence databases are available and used and that all key people know when the deployment is to take place (for example, to ensure that there are no potential conflicts of operations and to prepare the prisoner handling capability).

Finding 19. In discussions with ANPR managers, it was widely recognised that a key success factor was the preparatory intelligence to ensure that the ANPR team is sent to the most appropriate location at the right times and, most importantly, have access to local intelligence databases.

Findings: Vehicle stops

This section of the evaluation presents analysis in relation to the 180,543 vehicle stops undertaken by the intercept teams during Laser 2 and shows:

- As a mechanism to read the registration marks of moving vehicles, the ANPR systems used by the police proved extremely effective. They were able to read approximately 28 million VRMs. Combined with intelligence databases, over 1.1 million (3.9%) were identified as vehicles of interest to the police [Section 5.1].
- The intercept teams stopped 9.2% of these vehicles of interest (101,775) [Section 5.1].
- The intercept teams also stopped a further 78,768 vehicles as they passed as a result of officer observations [Section 5.2].
- The most common reason (45% of stops) for stopping a vehicle on the basis of an observation was that the vehicles or occupants looked suspicious, followed by not displaying a VED licence (20%) and not wearing a seatbelt (17%). This shows that in addition to addressing criminality, intercept teams are also contributing to road safety and the reduction of vehicle excise duty evasion [Section 5.2].
- As a proportion of all vehicle stops (44% over the duration of Laser 2), observation stops were significantly higher than Laser 1 (where only 22% came from observations) and increased during Laser 2. Possible reasons for this include: [Section 5.3]

– decreased confidence in using the DVLA databases as the primary means of stop

– the introduction of new fixed penalty notices which require observation-based stops

– the setting of targets including for fixed penalties issued per officer per week

• Proportionally, Asian drivers were more likely to get stopped from an officer observation than an ANPR stop [Section 5.3].

5.1 ANPR, reads, hits and stops

During Laser 2, ANPR cameras read approximately 28 million VRMs of which over 1.1 million (3.9%) resulted in a 'hit', that is a match with an intelligence database.

While the evaluation did not look at the accuracy of these VRM reads, feedback from the forces was that the ANPR systems were extremely accurate – anecdotal evidence that fewer than 1 in 25 reads were incorrect. In practice, ANPR controllers were able to confirm reads before officers intercepted hits – this virtually eradicated stopping vehicles where the ANPR reader had misread the VRM.

Finding 20. ANPR was seen to be an extremely effective means of reading VRMs and, when combined with an ANPR controller confirming VRMs before an intercept was requested, very few vehicles were incorrectly stopped as a result of an ANPR misread.

Finding 21. During Laser 2, ANPR cameras read approximately 28 million VRMs of which over 1.1 million (3.9%) resulted in a hit. In total, the ANPR intercept teams stopped 101,775 vehicles (9.2%) of these vehicles as a result of ANPR hits.

5.1.1 ANPR reads, hits and stops

Figure 5.1 shows the reads, hits and stops for each Laser 2 force.

Finding 22. Overall 3.9% of vehicles passing ANPR cameras were flagged against the intelligence systems as of potential interest to the police. Of these, the intercept teams stopped 9.2% – this meant that intercept teams stopped approximately 1 in 275 of vehicles passing ANPR cameras due to an ANPR hit. In Laser 1, the equivalent figure was 1 in 200 of vehicles passing ANPR cameras due to an ANPR hit.

Figure 5.1: ANPR reads, hits and stops by Laser 2 force

Force	VRM reads	VRM hits	% of reads generating hits	Vehicles stopped	% of hits stopped
Avon & Somerset	712,827	14,241	2.0%	4,488	31.5%
Cambridgeshire	1,258,102	79,027	6.3%	5,133	6.5%
Cheshire	1,663,304	56,851	3.4%	2,977	5.2%
City of London	137,757	5,536	4.0%	660	11.9%
Cleveland	476,284	19,133	4.0%	1,379	7.2%
Greater Manchester	949,743	33,108	3.5%	12,324	37.2%
Hampshire	1,007,023	23,431	2.3%	3,071	13.1%
Hertfordshire	894,107	15,265	1.7%	2,312	15.1%
Kent	3,715,374	92,484	2.5%	6,045	6.5%
Lancashire	1,358,883	30,208	2.2%	3,426	11.3%
Leicestershire	1,639,527	56,608	3.5%	7,011	12.4%
Lincolnshire	368,224	12,266	3.3%	7,527	61.4%
Merseyside	281,420	12,179	4.3%	4,422	36.3%
Metropolitan	281,420	12,179	4.0%	11,317	24.0%
North Wales	1,075,297	48,441	4.5%	4,277	8.8%
North Yorkshire	947,044	33,156	3.5%	2,140	6.5%
Northamptonshire	5,037,081	317,200	6.3%	4,633	1.5%
Northumbria	778,804	30,704	3.9%	3,203	10.4%
Nottinghamshire	488,029	24,004	4.9%	1,060	4.4%
Staffordshire	1,621,286	75,163	4.6%	2,662	3.5%
Warwickshire	1,237,070	27,790	2.2%	2,907	10.5%
West Midlands	684,086	18,304	2.7%	3,638	19.9%
West Yorkshire	745,771	39,586	5.3%	5,168	13.1%
Total / Average	**28,262,367**	**1,111,752**	**3.9%**	**101,775**	**9.2%**

Finding 23. The results from the forces showed a wide variation between the proportion of ANPR hits that were stopped, ranging from 1.5% (Northamptonshire) to 61.4% (Lincolnshire) – this reflects deployment tactics. For example Northamptonshire Police cover a wide area of road network through CCTV, while Lincolnshire only used mobile ANPR units and in-car systems.

VRM reads, hits and stops may include the same vehicle on a number of times, for example where a vehicle passes ANPR readers on many occasions (especially in areas where there are widespread ANPR-enabled CCTV systems). While forces collect data from the ANPR systems (for example the video feed) which could be used to analyse the number of times individual VRMs were read over the 13 month period (and indeed where they were read), this data is not collated centrally within a back office facility. No analysis could therefore be undertaken of the number of unique reads and hits from ANPR cameras.

Finding 24. If it is assumed that all vehicles have an equal chance of passing an ANPR camera, then approximately 1 in 25 vehicles on the road are of potential interest to the police. However, the lack of collation of all VRM read information across forces means that this estimate cannot be validated.

Overall the percentage of VRM reads that lead to a hit was lower than that achieved during Laser 1 – 3.9% in Laser 2 as opposed to 4.6% in Laser 1. This can be attributed to some forces' lack of confidence in DVLA's databases (which generated the majority of the hits), resulting in the databases not being used as the primary trigger for ANPR intercepts.

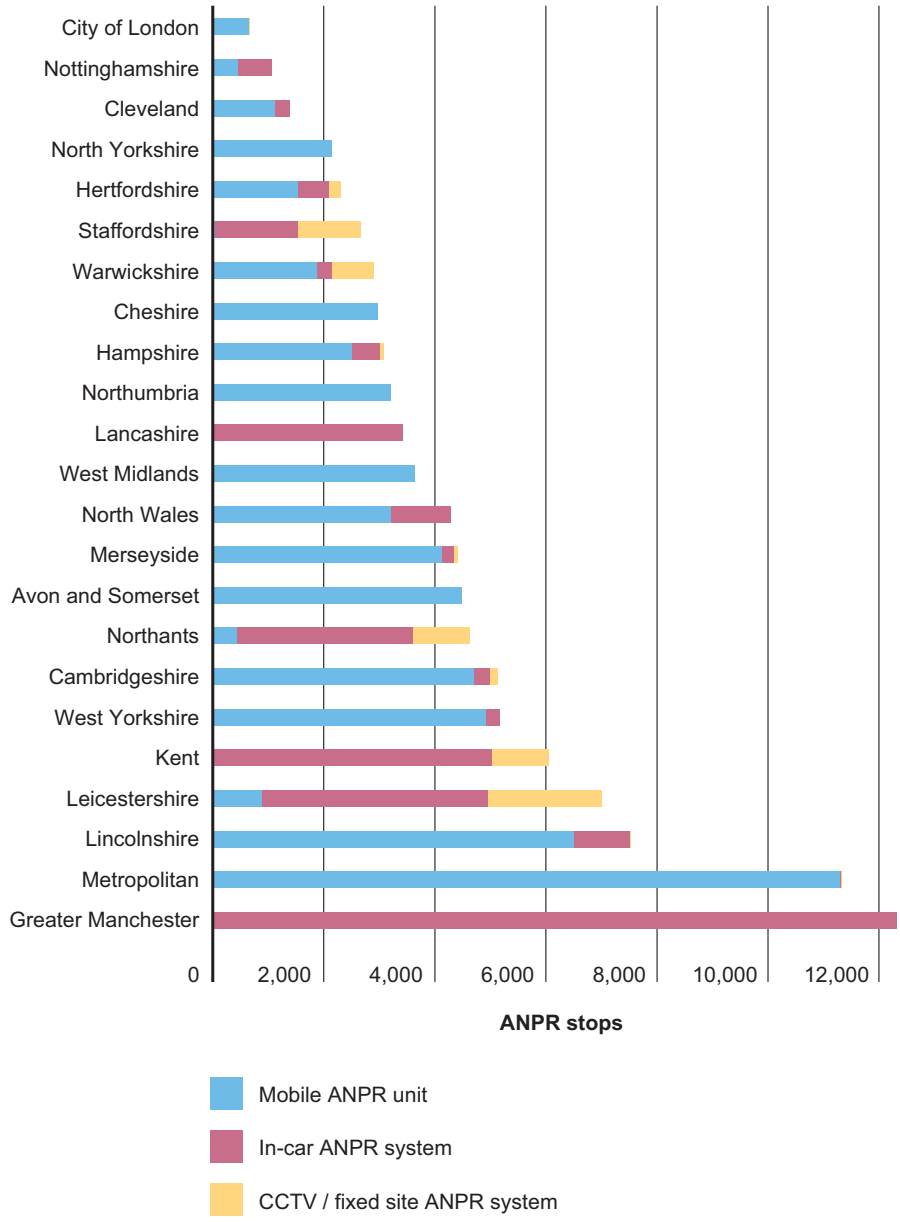
Similarly the percentage of vehicle hits stopped by the ANPR intercept teams was lower than that achieved during Laser 1 – 9.2% in Laser 2 as opposed to 12.7%. As will be seen below, the number of stops per hour was also less. However feedback from forces suggested that ANPR teams spent little time waiting for hits (dead time) and most of their time investigating vehicle hits.

This suggests that in Laser 2 officers were able to stop proportionally fewer of those vehicles of interest because they were spending more time per vehicle.

5.1.2 ANPR deployment method

The ANPR stops came from a variety of triggers. Overall, 59.7% of 101,775 ANPR stops were generated by mobile ANPR units, 34.0% from in-car systems and 6.3% from CCTV systems. Figure 5.2 shows the ANPR means of deployment for those hits that resulted in a stop for each of the Laser 2 forces.

Figure 5.2 ANPR stops by means of deployment

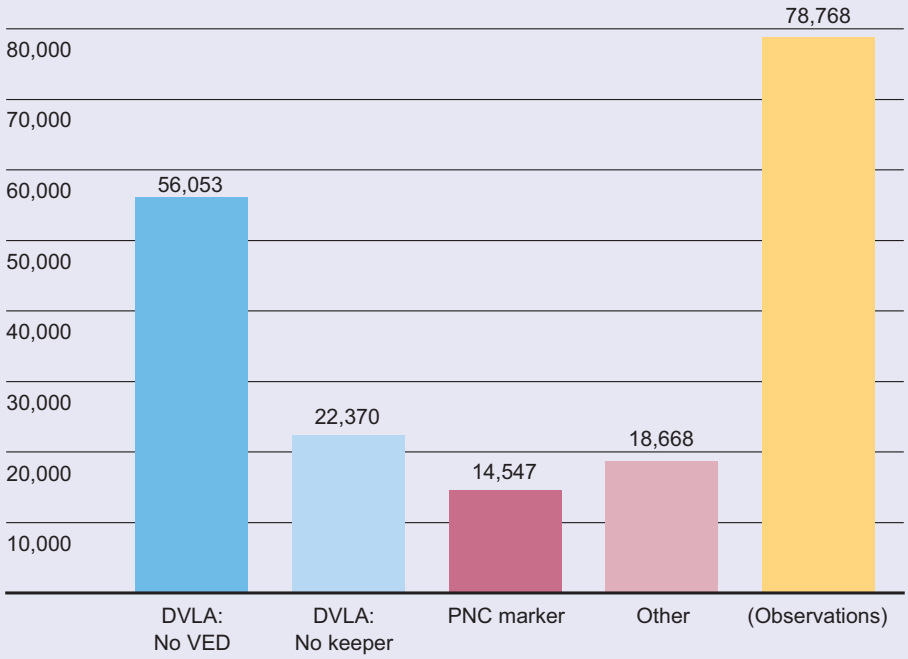


Finding 25. There was no relationship between the method of deploying ANPR cameras (CCTV, mobile unit and in-car system) and the total number of ANPR stops achieved. The volume of stops was dependent on other factors, in particular staffing.

5.1.3 Triggering database

During the pilot, a total of 101,775 vehicles were stopped as a result of ANPR hits, ie matches against intelligence databases. The source of the hits is shown in Figure 5.3 together with the 78,768 vehicle stops that were not triggered by an ANPR hit, but by an observation made by the intercept officer.[32]

Figure 5.3: Vehicles stops generated by database[33]



It should be noted that on a few occasions (about 9.7% of hits), a vehicle was stopped following hits from more than one database, for example a vehicle appeared on both PNC and DVLA's VED database – a similar level to that recorded during Laser 1.

Overall the two DVLA databases (no current Vehicle Excise Duty and No current keeper details) accounted for 70% of ANPR hits that led to stops. This is a lower proportion than that recorded during Laser 1 (75%), reflecting continued concerns within ANPR intercept teams about the DVLA database quality.

5.2 Observation-generated

Finding 26. As in Laser 1, intercept teams did not rely entirely on ANPR technologies for identifying vehicles to stop – the intercept teams also stopped vehicles as they passed as a result of officer observations. This led to an additional 78,768 vehicle stops that did not originate from ANPR hits, ie 44% of all stops made by the intercept teams.

[32] No information was collated on the triggering database for those 1,009,977 vehicles that generated a hit but were not stopped.

[33] Note that a vehicle can give rise to multiple hits, eg on PNC and DVLA No VED

This figure is significantly higher than Laser 1, where only 8,577 of the 39,188 (22%) of the vehicle stops were the result of officer observation. It was not evident that there was any single reason for the increased proportion of observation stops, however possible reasons include:

- decreased confidence in using the DVLA databases as the primary means of stop – a number of forces used the DVLA databases in combination with other data sources before deciding to stop vehicles. Hence, while there were broadly similar levels of vehicle hits to Laser 2, the actual number of these hits that were stopped was significantly lower (9.2% of hits stops in Laser 2 as opposed to 12.7% of hits stopped in Laser 1)
- the introduction of new fixed penalty notices requires observation-based stops, for example driving while using a mobile telephone can only be observed by an officer
- many forces set targets for arrests and fixed penalties issued per officer per week. While this helped to ensure that performance was delivered, it meant that greater emphasis was placed on keeping officers busy at all times rather than waiting for 'good quality' ANPR hits.

Finding 27. During Laser 2, the use of observation stops as a method of engaging criminality increased significantly at the expense of ANPR-generated stops. This reflects on the quality of underlying intelligence databases, which is discussed below.

Figure 5.4 shows the number of observation stops per force and the reason for the stop which includes multiple reasons, for example where the driver is using a mobile telephone and not wearing a seatbelt. Key points to note are:

- the largest single reason (44.8% of stops) for stopping a vehicle on the basis of an observation was 'other' – primarily, vehicles or occupants that looked suspicious but were not known to the police. The equivalent figure for Laser 1 was 49.7%
- the next largest category related to failing to display a valid VED (20.4% of observation stops). While DVLA's no VED database was one that all forces used as an ANPR trigger, DVLA's database excluded those vehicles with tax that had expired in the last two months. Further, DVLA's database also excluded those vehicles that were taxed but were not displaying their tax disc (an offence). Intercept officers were thus able to stop these vehicles on the basis of observation. These observations were less common than they were in Laser 1 (29.4%), despite the cost recovery element of the pilot that allowed forces to hypothecate revenue from the offence of failing to display a VED
- failing to wear seatbelt observations saw the most dramatic increases compared to Laser 1 – they rose from 6.0% of observations in Laser 1 to 17.0% in Laser 2

Figure 5.4: Reason for observation stops by force (percentages)

Force	Mobile phone	No seatbelt	Vehicle excise duty	Vehicle defect	Driving manner	Known person / vehicle	Other	Total stops
Avon & Somerset	1.9%	5.1%	17.2%	9.0%	9.3%	2.6%	54.9%	2,867
Cambridgeshire	2.8%	19.2%	14.1%	3.2%	5.2%	1.7%	53.8%	4,153
Cheshire	1.1%	4.2%	19.7%	5.5%	4.3%	0.6%	64.6%	2,134
City of London	5.2%	28.5%	10.6%	8.3%	4.5%	0.0%	2.9%	902
Cleveland	7.2%	19.5%	19.6%	7.9%	7.1%	10.3%	28.4%	2,068
Greater Manchester	2.6%	0.8%	6.0%	4.1%	.7%	0.2%	58.8%	3,463
Hampshire	1.9%	10.5%	32.4%	7.0%	6.6%	0.9%	40.5%	3,369
Hertfordshire	4.3%	28.5%	37.4%	4.6%	4.5%	2.1%	18.7%	3,328
Kent	2.8%	9.7%	8.6%	5.0%	3.6%	1.4%	68.8%	4,098
Lancashire	3.1%	27.6%	14.8%	7.7%	5.2%	3.2%	38.5%	8,100
Leicestershire	3.9%	9.4%	30.7%	3.8%	9.7%	1.3%	41.3%	2,837
Lincolnshire	0.9%	37.9%	4.6%	12.6%	2.5%	0.9%	40.6%	4,007
Merseyside	1.5%	4.8%	27.3%	2.7%	5.2%	1.1%	57.3%	2,335
Metropolitan	2.3%	14.7%	23.4%	8.7%	7.9%	1.6%	41.4%	6,717
North Wales	1.0%	17.5%	13.6%	5.5%	2.7%	0.8%	58.8%	6,728
North Yorkshire	2.7%	28.5%	10.8%	11.4%	6.6%	1.3%	38.6%	2,358
Northamptonshire	0.7%	2.3%	21.8%	1.9%	23.7%	14.0%	35.5%	2,365
Northumbria	2.2%	2.0%	3.9%	2.4%	9.2%	0.8%	79.6%	819
Nottinghamshire	2.9%	19.6%	4.9%	10.2%	20.7%	2.6%	39.2%	1,617
Staffordshire	10.3%	19.1%	20.9%	2.6%	25.5%	3.3%	18.2%	3,110
Warwickshire	1.7%	5.8%	20.3%	8.9%	5.8%	2.5%	55.1%	1,821
West Midlands	1.0%	21.7%	41.9%	1.2%	0.5%	0.0%	33.6%	5,109
West Yorkshire	2.1%	7.8%	37.5%	3.4%	4.9%	0.3%	44.0%	3,468
Total / Average	**2.7%**	**17.0%**	**20.4%**	**6.0%**	**7.0%**	**2.1%**	**44.8%**	**78,768**

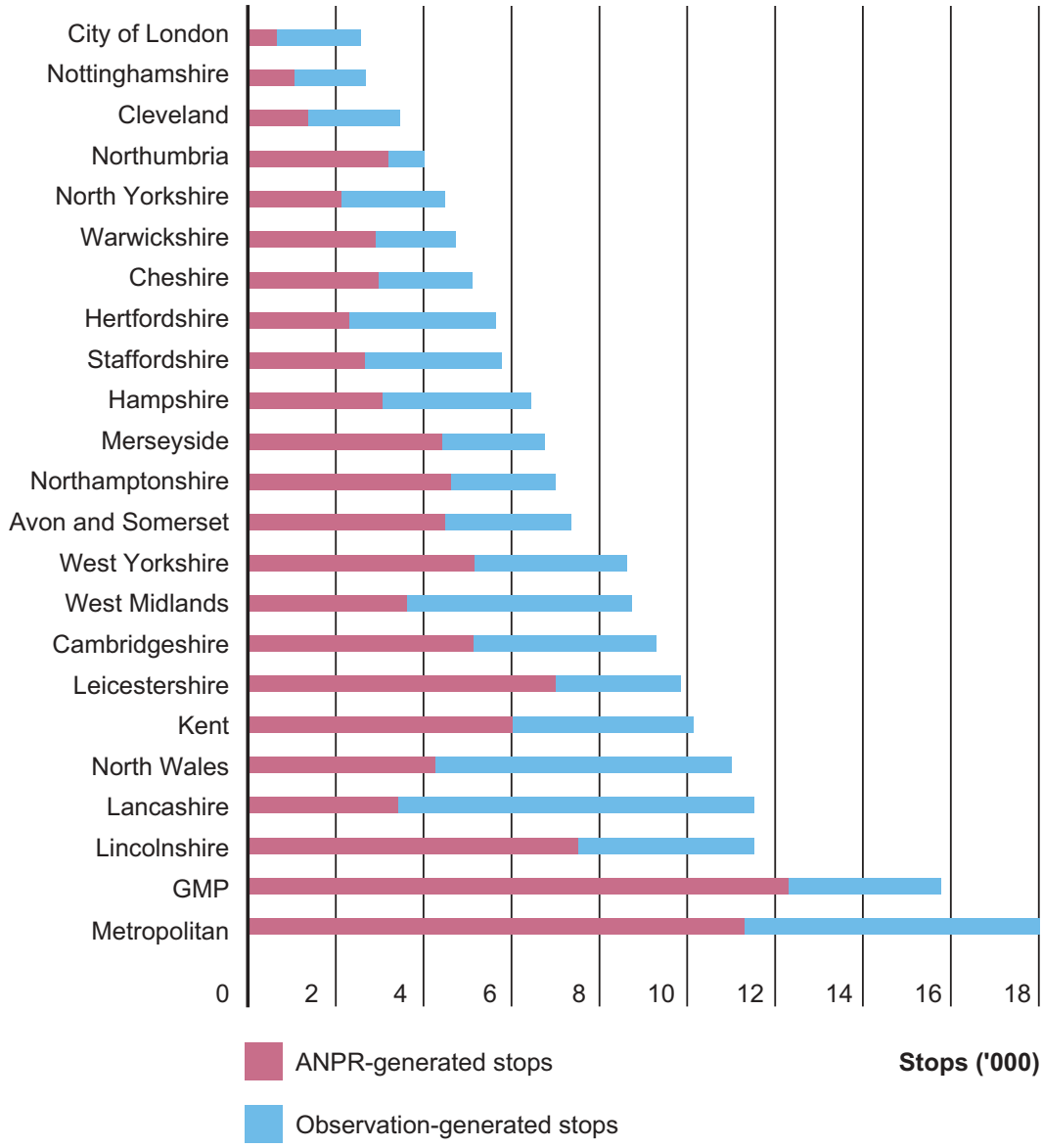
5.3 All Vehicle stops (ANPR and observations)

5.3.1 Vehicle stops by force

During the Laser 2, a total of 180,543 vehicles were stopped, 56% as a result of ANPR triggers and 44% as a result of observation. Figure 5.5 shows the total volume of stops by force.

The Metropolitan Police Service stopped the most vehicles while the City of London stopped the fewest. Greater Manchester Police stopped the largest number of vehicles following an ANPR trigger (78%), while as a proportion of their total stops, City of London (74%) and Lancashire (70%) stopped the most vehicles as a result of an observation.

Figure 5.5: Total volume of ANPR and observation stops



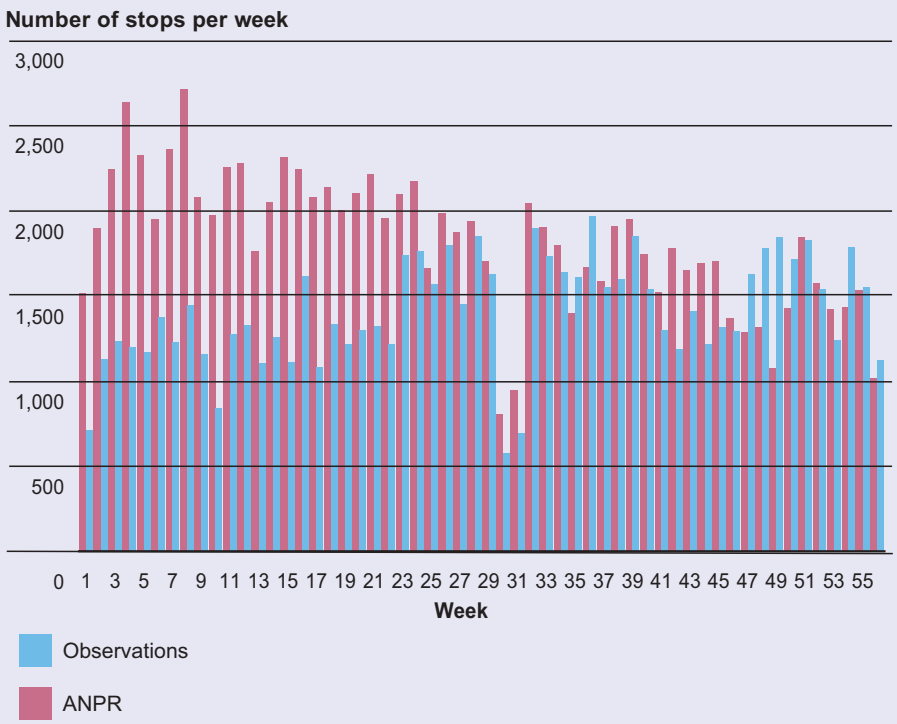
5.3.2 Vehicle stops over time

The balance of ANPR and observation-generated stops changed during the pilot. Figure 5.6 shows that observations became a more prominent reason for stopping in the later stage of the project, rising from 35% of stops in week 1 to 48% 12 months later. It is worth noting that the change is due to a decrease in the number of ANPR stops rather than to any significant increase in observation stops.

Late February to the end of March saw an increase in the number of ANPR stops. This corresponded to a period where the DVLA identified quality issues with their databases that led to their suspension for a month. In practice this meant that intercept teams were using out of date information. While this meant that more vehicles were being stopped, more of these were false positive hits, ie they were being incorrectly stopped. The quality of the databases is discussed in more detail in section 6 of this report.

Finding 28. The greater use of observation-generated stops during Laser 2 was a gradual development – during the first twenty weeks ANPR methods contributed between 60-70% of vehicle stops. In the last twenty weeks, this had fallen to between 50-60% of vehicle stops. The change in the balance of stops is primarily down to a decrease in the number of ANPR generated stops. This finding is counter to the drive towards intelligence-led policing.

Figure 5.6: Percentage of stops coming from ANPR and observation by week



5.3.3 Vehicle stops by ethnicity of driver

Officers were required to fill in a form recording the ethnicity of the driver of each vehicle stopped. Because this was done by means of questioning, drivers were entitled not to state their ethnicity, ('not stated'). However it was evident that in some cases the 'not stated' category equated to 'unknown'. Figure 5.7 shows the ethnicity of the vehicle driver for the 180,543 vehicle stops during Laser 2.

Figure 5.7: ANPR stops by ethnicity of driver – as reported by forces

	White	Asian	Black	Other	Mixed	Unknown / Missing	Total
Observation stops	77.4%	8.5%	5.9%	1.1%	0.8%	6.3%	100.0%
ANPR stops	71.5%	6.3%	6.9%	1.0%	0.9%	13.5%	100.0%
Total stops	**133,776**	**13,033**	**11,661**	**1,842**	**1,500**	**18,731**	**180,543**

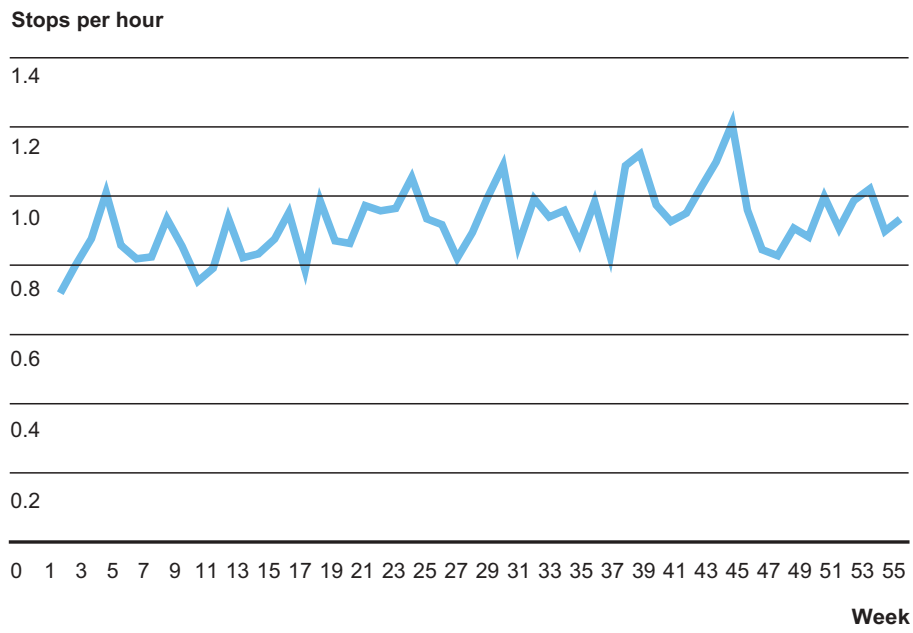
In terms of benchmarking data, there is no information available on the ethnicity of drivers on the road. However given that ANPR does not discriminate on the basis of ethnicity, it could be argued that ethnicity information from ANPR stops provides a surrogate baseline. On this basis, Figure 5.6 shows that drivers self-classified as white and Asian were more likely to be stopped as a result of observations than by ANPR.

Finding 29. The ethnicity data shows a significant difference between observations and ANPR stops for persons self-reported as White and Asian.

5.3.4 Vehicle stops by time spent intercepting

The volume of stops (both ANPR and observation) is primarily a function of the amount of time that teams spend intercepting. To take account of this, Figure 5.8 shows the number of stops per intercept hour during Laser 2.

Figure 5.8: Vehicle stops per intercept hour deployed by week



Overall the number of stops per intercept hour was stable at just under one stop throughout the 56 weeks (180,543 stops in 197,554 intercept hours equates to 0.91 stops per intercept hour). This may seem counter-intuitive – with more experience it might be expected that officers would become more effective at stopping vehicles and the average number of vehicles stopped per hour would increase. However from the beginning of the pilot, officers recognised that it was not the quantity of vehicle stops that was key, rather it was the quality of questioning and searching (where appropriate) that was crucial.

Discussion with intercept officers suggested that the majority of teams did not have to wait long for a 'hit'. The key to an effective operation was to identify vehicle hits that were most likely to lead to arrests. Once vehicles were stopped, the majority of an officer's time was spent investigating the hit. This is consistent with the fact that less than 10% of hits were actually stopped.

Finding 30. On average, just under one vehicle was stopped per officer hour intercepting – this level of performance was maintained throughout the pilot. In overall terms, 180,543 vehicles were stopped during 368,446 staff hours (including administration, prisoner handling and civilian time) – this equates to one vehicle stopped for every two hours staff input. Feedback from the field suggested that ANPR officers in intercept duty spent little time waiting for hits (dead time) and most of their time investigating vehicle hits – this is supported by the fact that less than 10% of vehicles that registered an ANPR hit were actually stopped.

Figure 5.9 lists the vehicle stops per intercept hour deployed by force and shows clear differences in the stops per hour by force. For example Lincolnshire averaged 1.78 vehicle stops per hour, while the City of London 0.4 stops per hour.

Finding 31. Analysis of vehicle stops per hour by force does not appear to be a strong indicator of performance – this reflects the different local conditions, operational objectives and stages of development at which ANPR intercept teams were operating.

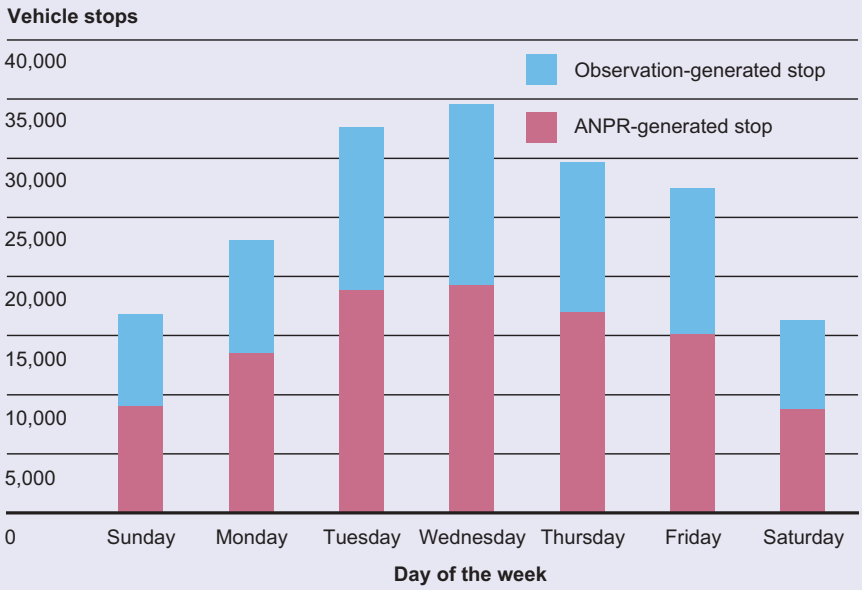
Figure 5.9: Vehicle stops per intercept hour deployed by force

Force	Vehicle stops	Intercept hours	Stops per hour
Avon & Somerset	7,354	7,663	0.96
Cambridgeshire	9,286	10,595	0.88
Cheshire	5,111	8,025	0.64
City of London	2,562	6,483	0.40
Cleveland	3,446	5,361	0.64
Greater Manchester	15,787	11,766	1.34
Hampshire	6,439	8,611	0.75
Hertfordshire	5,640	4,912	1.15
Kent	10,143	7,095	1.43
Lancashire	11,525	15,674	0.74
Leicestershire	9,848	9,078	1.08
Lincolnshire	11,533	6,497	1.78
Merseyside	6,756	5,011	1.35
Metropolitan	18,034	16,757	1.08
North Wales	11,005	8,006	1.37
North Yorkshire	4,498	6,412	0.70
Northamptonshire	6,998	12,220	0.57
Northumbria	4,021	7,181	0.56
Nottinghamshire	2,676	4,562	0.59
Staffordshire	5,771	8,427	0.68
Warwickshire	4,727	7,411	0.64
West Midlands	8,747	11,360	0.77
West Yorkshire	8,636	8,448	1.02
Total / Average	**180,543**	**197,554**	**0.91**

5.3.5 Vehicle stops by time and day

During the pilot, intercept officers recorded information on when and where they stopped each vehicle. Analysis of this information indicates that the most common day for stopping vehicles was Wednesday, with fewest vehicles being stopped on Saturdays and Sundays. Figure 5.10 shows the proportion of stops that were ANPR and observation-generated – overall there was no significant difference in the mix for stop by day of week (ie observations/ANPR-generated).

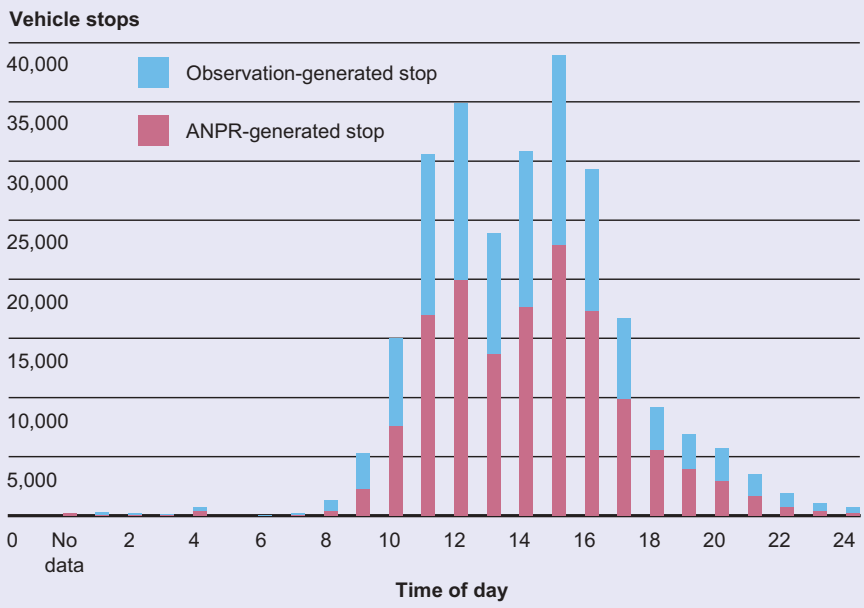
Figure 5.10: ANPR and observation-generated stops by day of week



Analysis of stops by time of day, shows that nearly 40% of vehicles stops took place between 10:00-12:00 and 13:00-15:00. This reflects the fact that forces worked primarily during business hours. Some forces did experiment with working later in the evening or at night. The effectiveness of operating at different times of day will be discussed more fully in a later section of the report.

Figure 5.11 shows the number of stops that were ANPR and observation-generated – overall there was no significant difference in the basis for stop by time. Stops were most likely during daylight hours (60% of stops at 6pm were ANPR-generated) and least likely between 11pm and 4am (when only 33% of stops were ANPR-generated).

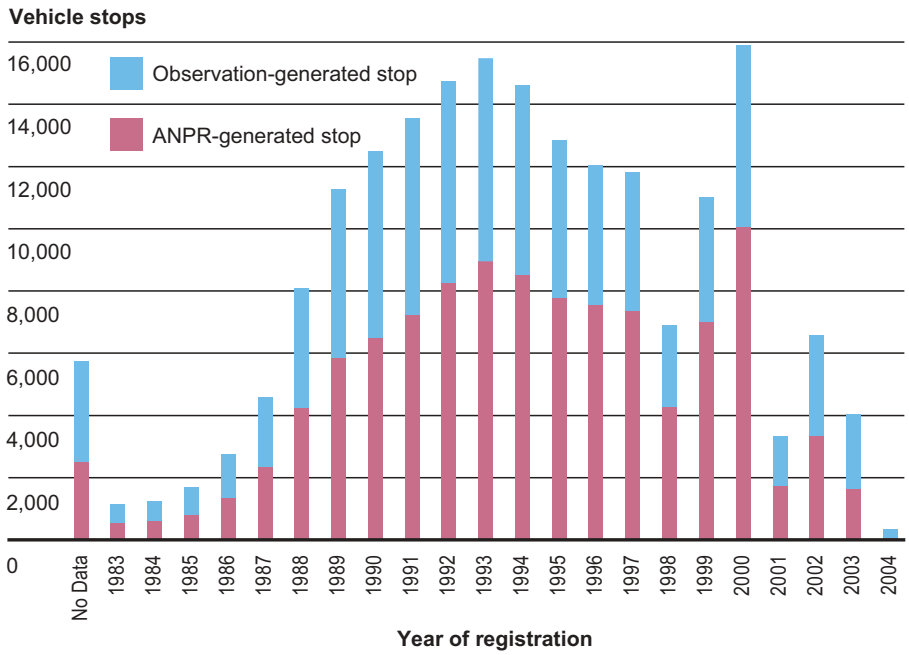
Figure 5.11: ANPR and observation-generated stops by time of day



5.3.6 Vehicle stops by estimated year of registration

The VRM of each vehicle stopped by officers was recorded. From this it was possible to estimate when a vehicle was first registered, accepting that in a small number of cases a VRM may be transferred from an older to newer vehicle. Cars registered in 2000 were stopped most frequently – these stops originated from hits against DVLA's No current keeper database. Figure 5.12 shows the number of vehicle ANPR and observation-generated stops by the (estimated) year of vehicle registration.

Figure 5.12: ANPR and observation-generated stops by year of vehicle registration



Finding 32. Overall, newer vehicles were more likely to be stopped through an ANPR match, while older cars were more likely to be stopped as a result of officer observation.

5.3.7 Vehicle stops by location

As part of the pilot, forces were asked to record the postcode district (eg BS5 for Bristol) in which they deployed their ANPR intercept teams. This was not always captured (only 80% of the stops included a postcode and two forces recorded no valid postcode district information), however it does provide some insight into the locations where the different forces were deployed. Overall, 15% of all vehicle stops happened in 21 postcode districts, ie within a relatively small area.

Figure 5.13 lists:

- the number of different postcode districts recorded by forces at which vehicle stops took place. While forces may have visited more than one location in a particular postcode district, it is a useful surrogate as to the approximate concentration of ANPR operations

• the single postcode district leading to the most number of vehicle stops

• the number of vehicle stops within that postcode district

• the percentage of all force stops in that postcode district.

Figure 5.13: ANPR and observation-generated stops by year of vehicle registration

	Number of different postcodes	Postcode leading to most stops	Stops at this postcode	Stops at most visited site as % of all stops
Avon & Somerset	26	BS5	372	5.1%
Cambridgeshire	47	PE1	1,548	16.7%
Cheshire	30	WA8	1,472	28.8%
City of London	2	EC2	36	1.4%
Cleveland	27	TS5	353	10.2%
Greater Manchester	74	M14	1,521	9.6%
Hampshire	53	PO2	393	6.1%
Hertfordshire	45	SG1	1,841	32.6%
Kent	3	CT4	5,549	54.7%
Lancashire	42	FY3	1,373	11.9%
Leicestershire	-	-	-	-
Lincolnshire	29	PE25	1,794 1	5.6%
Merseyside	47	L36	912	13.5%
Metropolitan	160	SE1	584	3.2%
North Wales	45	LL18	3,132	28.5%
North Yorkshire	34	DL10	546	12.1%
Northamptonshire	9	NN1	1,389	19.8%
Northumbria	39	NE4	339	8.4%
Nottinghamshire	-	-	-	-
Staffordshire	31	ST1	1,383	24.0%
Warwickshire	5	CV31	969 2	0.5%
West Midlands	71	B20	633	7.2%
West Yorkshire	45	LS1	475	5.5%

While City of London deployed ANPR intercept teams within only two postcode districts, their force covers a total of only four postcode districts. At the other extreme, the Metropolitan Police Service had very dispersed ANPR operations, deployed in 160 different postcode districts.

Findings, action taken, property recovered and arrests made

This section of the evaluation sets out the actions that arose from the intercepts. In total, including stops from both ANPR hits and observation, there are records of the actions for 180,543 stops.

1. **There were 13,499 people arrested, including:** [Section 6.3]
   - 2,263 arrests for theft and burglary
   - 3,324 arrests for driving offences (for example driving whilst disqualified)·
   - 1,107 arrests for drugs offences
   - 1,386 arrests for auto crime (theft from and of vehicles)
   - 55% of these already had a criminal record
2. **Across Laser 2 forces, the average level of performance was around 91 arrests per FTE per annum (compare to a national 'average' of around 10):** [Section 6.3]
   - as a targeted approach, ANPR teams are over nine times more effective than conventional policing
   - there were substantial differences in the number of arrests made per FTE between forces. For example four police forces (Merseyside, Nottinghamshire, North Wales and West Midlands) had over 140 arrests per FTE

- these differences between performance cannot be accounted for by force type – better performing areas were characterised by strong leadership, good intelligence and experienced officers

3. **A large amount of goods, drugs and weapons were recovered, including:** [Section 6.2]
   - 1,152 stolen vehicles were recovered (valued at over £7.5 million)
   - drugs worth over £380,000 were seized from 740 vehicles
   - stolen goods worth over £640,000 were recovered from 430 vehicles 266 offensive weapons and 13 firearms were seized
4. **There was a strong correlation between vehicle documentation offences and volume crime:** [Section 6.3]
   - 3,549 (26%) of arrests originated from vehicle stops for no VED or no current keeper details
   - section 8.4.3 shows that older vehicles are more likely to be guilty of vehicle document offences. In this section we show that, per 100 vehicles stopped, more arrests are made from older vehicles
   - section 5 showed that the majority of stops were conducted in normal working hours whereas, in this section, we show that the conversion rate increased in the evening. By changing deployment patterns, conversion rates could improve further.

6.1 Possible actions taken at a stop site

For all the vehicle stops, the intercept officer kept a record of the actions that were undertaken. These were:

- vehicle/person search
- recovery of property
- arrest
- reported for summons
- issuing a fixed penalty
- issuing a note requiring follow-up action – these include issuing a PG9, HO/RT1, CLE2/6, CLE2/7, CLE2/8, V62 or VDRS
- intelligence log
- verbal advice.

Results from these actions are discussed in turn below:

6.2 Vehicle/person search

The breakdown of searches of vehicles, people, and the recovery of property for each force can be seen in figure 6.1 overleaf.

Finding 33. Of the 180,543 vehicle stops, officers searched 4,402 (2.4%) vehicles and 6,331 drivers or passengers at the roadside. As a result of these searches, officers recovered 1,152 stolen vehicles (valued at over £7.5 million), drugs on 740 occasions (with a street value of over £380,000), stolen goods on 430 occasions (valued at over £640,000), 13 firearms and 266 offensive weapons.

There were significant differences in the value of recovered property and the volume of items recovered across forces, reflecting the different number of stops made by forces. Figure 6.2 overleaf shows the number of searches and the recovery of property for each force per 100 vehicles stopped.

Finding 34. On average Laser 2 intercept officers:

- **searched one out of every 41 vehicles stopped**
- **recovered one stolen vehicle for every 157 vehicles stopped**
- **recovered stolen goods from one stolen vehicle for every 420 vehicles stopped**
- **found drugs in one in every 243 vehicles stopped.**

Finding 35. Based on the staffing levels identified by forces, each intercept officer would expect to recover the following over the course of a year:

- **seven stolen vehicles, with a total value of approximately £46,000**
- **stolen goods on three occasions, with a total value of approximately £4,500**
- **drugs to be seized on four to five occasions, with a total value of approximately £2,400**
- **one to two offensive weapons/firearms**
- **other property on two occasions.**

Figure 6.1: Searches of vehicles, persons and items recovered by force

	Searches		Items recovered						Value of vehicles/goods recovered		
	Vehicles	Persons	Stolen Vehicle	Stolen Goods	Firearms	Drugs	Offensive Weapon	Other	Vehicles	Drugs	Other
Avon & Somerset	106	208	45	6	1	32	11	9	£288,080	£8,105	£1,290
Cambridgeshire	270	368	28	10	-	20	14	11	£140,020	£46,570	£192,293
Cheshire	199	309	48	38	-	34	9	8	£380,700	£20,500	£10,928
City of London	27	28	7	3	-	3	-	10	£79,000	£50	£1,588
Cleveland	146	166	96	3	-	5	4	-	£117,145	£3,675	£4,020
Greater Manchester	114	137	37	13	-	18	5	12	£245,900	£545	£1,341
Hampshire	102	158	25	10	-	14	4	11	£133,495	£480	£2,544
Hertfordshire	49	86	29	12	-	8	4	9	£188,400	£7,172	£2,143
Kent	117	168	35	25	-	10	20	24	£228,700	£530	£5,982
Lancashire	238	297	36	17	-	33	3	10	£276,950	£2,060	£85,495
Leicestershire	153	227	58	41	1	36	11	14	£402,059	£3,255	£62,764
Lincolnshire	253	126	15	16	-	9	5	24	£76,000	£3,275	£40,510
Merseyside	146	140	56	19	1	14	7	11	£371,300	£3,150	£22,926
Metropolitan	1,064	1,773	129	48	4	90	34	12	£1,159,400	£19,915	£87,486
North Wales	404	660	37	55	1	170	18	33	£243,150	£26,974	£3,997
North Yorkshire	97	166	26	10	-	14	-	4	£265,775	£33,628	£19,900
Northamptonshire	128	240	158	53	1	34	20	30	£888,550	£6,670	£39,863
Northumbria	101	91	7	5	-	15	4	10	£6,550	£54,972	£605
Nottinghamshire	250	310	88	15	1	37	20	5	£533,500	£24,670	£34,753
Staffordshire	169	227	20	8	-	19	1	44	£163,820	£3,710	£3,637
Warwickshire	144	259	26	12	1	5	2	11	£250,550	£1,145	£5,478
West Midlands	7	31	86	7	2	103	69	5	£775,025	£114,880	£14,360
West Yorkshire	118	156	60	4	-	17	1	19	£363,250	£1,645	£900
Total	**4,402**	**6,331**	**1,152**	**430**	**13**	**740**	**266**	**326**	**£7,577,319**	**£387,576**	**£644,803**

Figure 6.2: Number of searches and goods recovered or seized by force per 100 vehicle stops

	Searches		Items recovered						Value of vehicles/goods recovered		
	Vehicles	Persons	Stolen Vehicle	Stolen Goods	Firearms	Drugs	Offensive Weapon	Other	Vehicles	Drugs	Other
Avon & Somerset	1.44	2.83	0.61	0.08	0.01	0.44	0.15	0.12	£6,402	£253	£215
Cambridgeshire	2.91	3.96	0.30	0.11	-	0.22	0.15	0.12	£5,001	£2,329	£19,229
Cheshire	3.89	6.05	0.94	0.74	-	0.67	0.18	0.16	£7,931	£603	£288
City of London	1.05	1.09	0.27	0.12	-	0.12	-	0.39	£11,286	£17	£529
Cleveland	4.24	4.82	2.79	0.09		0.15	0.12	-	£1,220	£735	£1,340
Greater Manchester	0.72	0.87	0.23	0.08	-	0.11	0.03	0.08	£6,646	£30	£103
Hampshire	1.58	2.45	0.39	0.16	-	0.22	0.06	0.17	£5,340	£34	£254
Hertfordshire	0.87	1.52	0.51	0.21	-	0.14	0.07	0.16	£6,497	£896	£179
Kent	1.15	1.66	0.35	0.25	-	0.10	0.20	0.24	£6,534	£53	£239
Lancashire	2.07	2.58	0.31	0.15	-	0.29	0.03	0.09	£7,693	£62	£5,029
Leicestershire	1.55	2.31	0.59	0.42	0.01	0.37	0.11	0.14	£6,932	£90	£1,531
Lincolnshire	2.19	1.09	0.13	0.14	-	0.08	0.04	0.21	£5,067	£364	£2,532
Merseyside	2.16	2.07	0.83	0.28	0.01	0.21	0.10	0.16	£6,630	£225	£1,207
Metropolitan	5.90	9.83	0.72	0.27	0.02	0.50	0.19	0.07	£8,988	£221	£1,823
North Wales	3.67	6.00	0.34	0.50	0.01	1.54	0.16	0.30	£6,572	£159	£73
North Yorkshire	2.16	3.69	0.58	0.22	-	0.31	-	0.09	£10,222	£2,402	£1,990
Northamptonshire	1.83	3.43	2.26	0.76	0.01	0.49	0.29	0.43	£5,624	£196	£752
Northumbria	2.51	2.26	0.17	0.12	-	0.37	0.10	0.25	£936	£3,665	£121
Nottinghamshire	9.34	11.58	3.29	0.56	0.04	1.38	0.75	0.19	£6,063	£667	£2,317
Staffordshire	2.93	3.93	0.35	0.14	-	0.33	0.02	0.76	£8,191	£195	£455
Warwickshire	3.05	5.48	0.55	0.25	0.02	0.11	0.04	0.23	£9,637	£229	£456
West Midlands	0.08	0.35	0.98	0.08	0.02	1.18	0.79	0.06	£9,012	£1,115	£2,051
West Yorkshire	1.37	1.81	0.69	0.05	-	0.20	0.01	0.22	£6,054	£97	£225
Total	**2.44**	**3.50**	**0.64**	**0.24**	**0.01**	**0.41**	**0.15**	**0.18**	**£6,578**	**£524**	**£1,500**

These findings represent a slight drop from those recorded in Laser 1. As will be highlighted below, this reduction could be partly attributed to a decrease in accuracy of the DVLA databases leading to more time being spent dealing with incorrect hits.

Unsurprisingly, PNC was an extremely effective means for identifying stolen vehicles (six times more effective than other stop reasons), and identifying where stolen goods or drugs might be recovered (twice as effective than other stop reasons).

Figure 6.3 shows that the profile of driver ethnicity of the vehicles that were searched closely matches the profile of ethnicities for all stops for the majority of ethnic backgrounds. The major exception to this is the Black ethnic group. While they drive only 6.5% of the vehicles stopped, 14.9% of the cars searched were being driven by people in that ethnic category.

Figure 6.3: Profile of driver ethnicity of searched vehicles

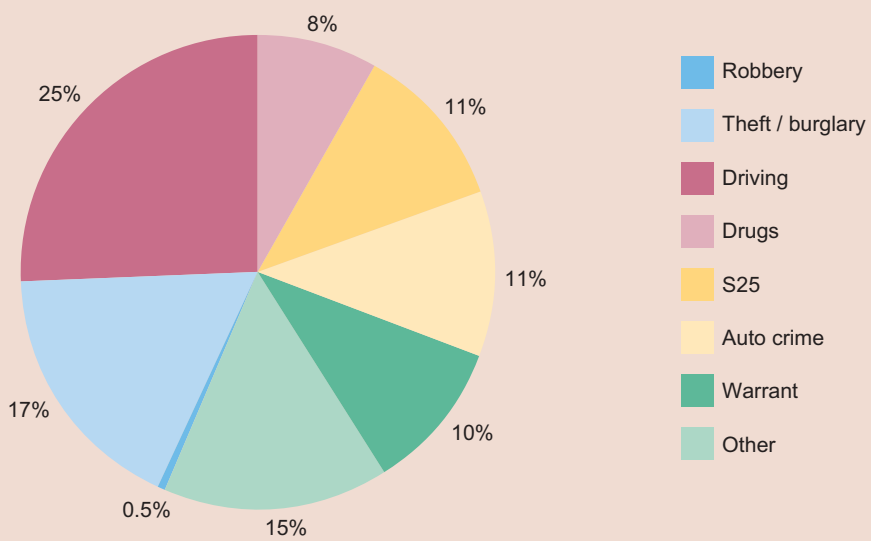
Stated ethnic background	% vehicles searched	% vehicles stopped
White	72.4%	74.1%
Asian	6.4%	7.2%
Black	14.9%	6.5%
Other	1.0%	1.0%
Mixed	1.6%	0.8%
Not Stated/ Unknown	3.6%	10.4%

6.3 Arrests

6.3.1 Arrests by type

The key priority for the 23 forces involved in Laser 2 was to engage with criminals and deny them use of the roads. In practice this meant stopping and arresting criminals. **During the 13 months of Laser 2, there were 13,499 arrests by the intercept teams.** Figure 6.4 shows the reason for arrest.[32] Note that if a person was arrested more than once then only the most serious arrest was recorded, as opposed to recording each arrest made. Information on arrests that were subsequently de-arrested was not collected.

Figure 6.4: Reason for arrest



[32] Section 25 arrests include offences that could normally be dealt with by means of a fixed penalty or a report for summons, however the offender had a history of failing to pay or appear at Court. Auto crime is theft from or of a vehicle.

Figure 6.4 shows that a small proportion (25%) of arrests of vehicle drivers were for driving offences, with the majority of arrests for serious criminal offences, including 17% for theft or burglary. Relative to Laser 1, this breakdown represents a slight change in the profile of arrests:

- Theft/Burglary account for 17% of arrests (previously 21%) [2,263 arrests]
- The number of arrests for driving offences has increased from 20% to 25% [3,324 arrests]
- Arrests for drugs offences have fallen from 11% to 8% [1,107 arrests]
- Section 25 arrests have seen a significant increase, rising from 7% to 11% [1,486 arrests]
- Auto crime arrests accounted for 10% of arrests while previously they were 12% [1,386 arrests]
- Warrants have increased from 11% to 13% [1,812 arrests]
- Arrests for other reasons have fallen from 17% to 15% [2,043 arrests]
- Robbery has remained the smallest category for arrests staying below 1% [78 arrests].

Finding 36. ANPR-enabled intercept officers arrested someone on average once every thirteen vehicle stops. Only 25% of arrests related to driving offences, ie the vast majority of arrests were for non-driving matters. It is also worth noting that in 7,456 of the 13,499 arrests (55%) the people arrested had previous police records.

Figure 6.5 overleaf lists the total number of arrests, arrest types, stops and arrests per 100 vehicle stops by force.

Figure 6.5 shows a wide variation in the number of arrests made by forces – three forces (Metropolitan Police Service, Northamptonshire and West Midlands) achieved over 1,100 arrests during the 13 month period while one force (City of London) achieved less than 100.

In terms of arrest types by force, again there was wide variation, for example:

- relatively few arrests were for robbery (0.6%). While Avon & Somerset and Cleveland reported a much higher proportion of arrests for robbery, their total number of arrests was small and these results are therefore not significant
- arrests for theft or burglary showed wide variation from the average (16.8%) – in three forces less than 10% of roadside arrests were theft or burglary (Avon and Somerset, North Wales and Staffordshire), while for nine forces more than 20% of arrests were for theft or burglary

- Cleveland made nearly double (46.5%) the average number of intercept arrests (24.6%) for driving offences
- North Wales made nearly treble (23.5%) the average number of intercept arrests (8.2%) for drugs offences
- Northumbria made nearly double (21.2%) the average number of intercept arrests (11.0%) for Section 25 offences, while very few (1.6%) of Northamptonshire arrests were for Section 25 offences
- Only 1.8% of Cleveland's arrests were for auto crime, compared to the Laser 2 average of 10.3% and Hertfordshire where 19.5% of arrests were for auto crime
- 8.1% of Herefordshire's arrests were for outstanding warrants, compared to the Laser 2 average of 13.4% and Northumbria where only 3.4% of arrests were for outstanding warrants.

This spread of arrest type reflects different force operational priorities, staffing experience and quality of local databases.

Figure 6.5: Total arrests, stops and arrests per 100 vehicle stops and arrest types by force

			Arrests per		Percentage of arrests							
	Arrests	Stops	100 stops	100 hours intercepting	Robbery	Theft/ Burglary	Driving	Drugs	S25	Auto Crime	Warrent	Other reason
Avon & Somerset	343	7,354	4.66	4.47	2.0%	9.1%	37.1%	6.0%	6.3%	12.0%	20.9%	6.7%
Cambridgeshire	516	9,286	5.56	4.87	0.6%	17.5%	13.1%	8.9%	12.6%	5.5%	16.4%	25.4%
Cheshire	517	5,111	10.12	6.44	0.0%	14.2%	19.2%	8.6%	15.6%	16.2%	13.9%	12.2%
City of London	76	2,562	2.97	1.17	0.0%	21.1%	13.2%	5.3%	6.6%	5.3%	14.5%	34.2%
Cleveland	393	3,446	11.39	7.32	1.8%	17.8%	46.5%	3.6%	4.8%	1.8%	14.3%	9.4%
Greater Manchester	914	15,787	5.79	7.77	0.0%	10.2%	31.1%	5.9%	21.2%	5.4%	11.5%	14.8%
Hampshire	387	6,439	6.01	4.49	0.0%	10.1%	27.5%	7.8%	15.5%	11.9%	12.5%	14.7%
Hertfordshire	280	5,640	4.97	5.70	0.0%	19.8%	15.5%	3.9%	3.6%	19.5%	28.1%	9.6%
Kent	351	10,143	3.46	4.95	0.0%	20.9%	24.7%	3.7%	5.4%	12.5%	8.2%	24.6%
Lancashire	776	11,525	6.73	4.95	0.6%	10.6%	36.7%	8.6%	11.8%	12.0%	11.3%	8.4%
Leicestershire	599	9,848	6.08	6.59	0.3%	14.9%	35.2%	4.8%	8.4%	10.5%	11.4%	14.5%
Lincolnshire	515	11,533	4.47	7.93	0.2%	22.7%	17.8%	5.3%	17.1%	4.5%	10.2%	22.2%
Merseyside	665	6,756	9.84	13.27	0.0%	17.2%	18.1%	5.9%	18.1%	11.0%	17.6%	12.1%
Metropolitan	1,406	18,034	7.80	8.39	0.6%	21.8%	12.1%	11.0%	9.3%	8.1%	10.5%	26.6%
North Wales	862	11,005	7.83	10.77	0.2%	8.6%	33.6%	23.4%	12.8%	7.1%	6.5%	7.8%
North Yorkshire	258	4,498	5.74	4.02	0.0%	23.3%	23.6%	9.3%	11.8%	12.4%	5.0%	14.5%
Northamptonshire	1,152	6,998	16.46	9.43	1.3%	19.2%	25.6%	5.6%	1.6%	16.6%	15.5%	14.5%
Northumbria	334	4,021	8.29	4.64	0.9%	20.5%	17.2%	7.2%	30.3%	6.3%	3.4%	14.1%
Nottinghamshire	601	2,676	22.46	13.17	0.5%	20.2%	23.4%	7.9%	13.2%	9.2%	10.9%	14.6%
Staffordshire	477	5,771	8.27	5.66	0.0%	8.6%	39.0%	3.4%	13.5%	5.7%	18.2%	11.6%
Warwickshire	254	4,727	5.37	3.43	0.0%	21.3%	35.0%	2.8%	8.7%	6.7%	18.3%	7.3%
West Midlands	1,386	8,747	15.84	12.20	1.2%	23.2%	16.0%	10.6%	6.0%	14.1%	15.8%	13.1%
West Yorkshire	436	8,636	5.05	5.17	1.1%	11.3%	22.8%	5.0%	4.9%	13.9%	24.2%	16.7%
Total/Average	**13,499**	**180,543**	**7.48**	**6.83**	**0.6%**	**16.8%**	**24.6%**	**8.2%**	**11.0%**	**10.3%**	**13.4%**	**15.1%**

6.3.2 Arrests per 100 vehicle stops and per 100 hours intercepting

To understand the volume of arrests for each force in the proper context it is important to look at them relative to the amount of effort that each force has expended in ANPR activities (officer hours), as well as the productivity of the stops that are made using different deployments (number of arrests per 100 stops).

Figure 6.5 shows that on average Laser 2 forces made 7.5 arrests per 100 vehicle stops – slightly below the 7.8 arrests per 100 vehicle stops achieved during Laser 1. Three forces (West Midlands, Northamptonshire and Nottinghamshire) achieved more than twice the Laser 2 average of arrests per 100 vehicles stopped, while two forces (Kent and City of London) achieved less than half the Laser 2 average. Figure 6.5 also shows that on average Laser 2 forces made 6.8 arrests per 100 hours of officer time spent intercepting – again below the 8.3 arrests per 100 hours of officer time spent intercepting during Laser 1.

In terms of how arrest levels varied during the course of the pilot, Figure 6.6 shows the number of arrests per 100 hours of officer time spent intercepting and the arrests per 100 vehicles stopped. Overall, both these measures have remained largely stable during the period of the pilot, showing slight increases as forces became more experienced.

Figure 6.6: Arrests by week per 100 hours staff input and per 100 vehicles stopped

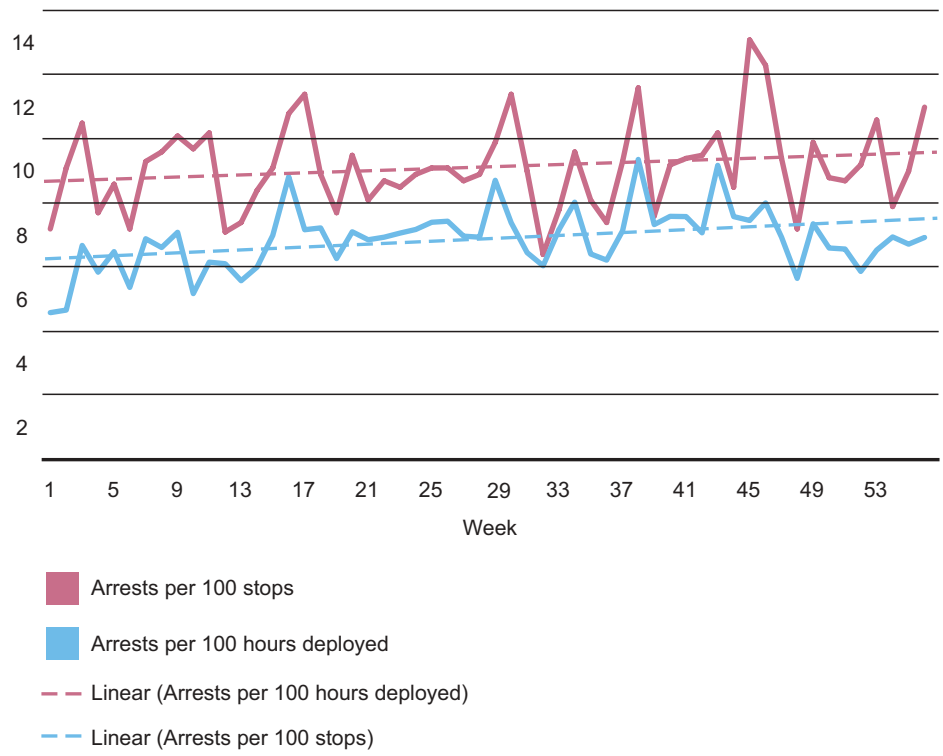


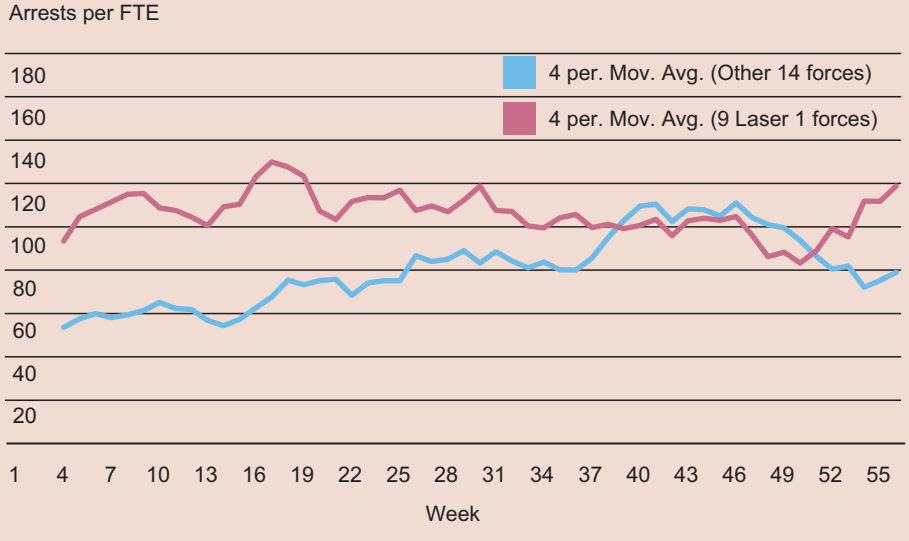
Figure note: the solid lines show the actual data, while the dotted lines show the trend.

Finding 37. ANPR-enabled intercept officers made 7.5 arrests per 100 vehicle stops and 6.8 arrests per 100 hours of officer time spent intercepting. During Laser 2 there was a slight overall increase in performance.

In terms of arrests per FTE, Laser 2 achieved 91 per FTE, compared to the 105 achieved during Laser 1. Figure 6.7 shows that during Laser 2, those forces that had been part of Laser 1 performed significantly differently to those that were 'new' ANPR forces to Laser 2. In particular:

- new Laser 2 forces started with a much lower arrest per FTE base (approximately 52) and that this increased to a peak of well over 100 during March 2004. Their performance since then has slipped to around 80. Throughout Laser 2 these forces have achieved on average an arrest rate of 78 per FTE
- Laser 1 forces started with a much higher baseline arrest rate (over 100 as per Laser 1), however this started declining at the beginning of 2004, but has subsequently picked up. Throughout Laser 2 these forces have achieved on average an arrest rate of 106 per FTE.

Figure 6.7: Arrests per FTE for Laser 1 and new Laser 2 forces during Laser 2



Finding 38. During Laser 2, those forces that were part of Laser 1 have, on average, managed to replicate the high levels of performance achieved during Laser 1 over a 13-month period. Forces new to Project Laser have taken nearly eight months to achieve the performance benchmark set in Laser 1 and, as yet, have been unable to sustain this for a prolonged period. Within the forces new to Laser 2, there are however, a number of generally underperforming forces (as classified by PSU). This lower level of performance during Laser 2 is therefore not completely surprising.

Finding 39. Comparison of arrest rates per FTE during Laser 2 against Laser 1 shows that the introduction of cost recovery has not adversely affected this key performance metric.

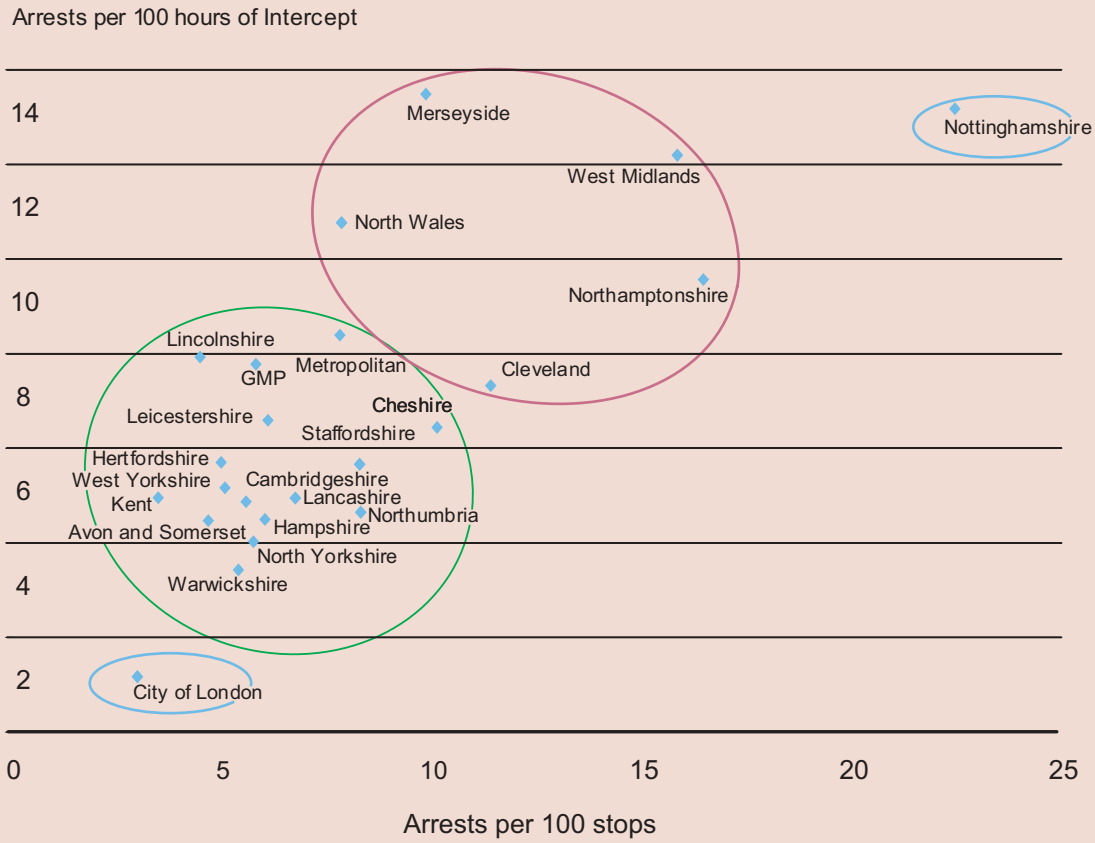
Looking at the performance of the original 9 forces alone, the number of arrests per FTE had stayed stable (from 105 in Laser 1 to 106 in Laser 2). This suggests that the introduction of hypothecation has not distorted policing priorities.

Figure 6.5 showed that there are significant differences in performance between forces in terms of arrests per 100 stops and arrests per 100 hours deployed. Specifically are three groupings of forces as follows:

- the **top performers** – a group of five forces (Merseyside, North Wales, Cleveland, West Midlands and Northamptonshire) which achieved significantly higher levels of performance in terms of arrests per 100 stops and arrests per 100 hours deployed. Interestingly, this group includes both rural and urban forces, those that were part of Laser 1 and those that were not, forces with which the PSU is engaged for performance issues and those that are not, and a spread of means of deployment (CCTV, in-car system and mobile unit). This would suggest that high performance has more to do with 'softer' issues (the experience of the team, local databases, deployment tactics, leadership, senior management support) than general force characteristics
- **outliers** – specifically Nottinghamshire and City of London which recorded the fewest number of stops:
  - given its geography, size and the presence of the ring of steel, the City of London is a unique force. In particular, given the level of security and monitoring of roads within the Square Mile, many criminals will actively choose to avoid the area and hence ANPR has effectively denied criminals the use of the road
  - statistically, the performance of Nottinghamshire is considered an outlier. It is therefore debatable that their performance could be scaled up correspondingly
  - the pack – which includes the remaining 16 forces which have not achieved the top level of performance. Within this group, there are those that have performed significantly better than others.

These groupings are shown in Figure 6.8 below.

Figure 6.8: Arrests by week per 100 hours staff input by arrests per 100 vehicles stopped



Finding 40. Three broad categories of intercept team performance have been identified, namely those that achieved significantly better performance (five forces), those that achieved around average performance (sixteen forces) and those where there were too few stops to indicate sustainable and scalable performance. These groupings are not based on force or ANPR characteristics; rather they appear to reflect differences in management and deployment.

Finding 41. On the basis of the staffing inputs identified by forces, each intercept officer full time equivalent would expect to make 91 arrests per year. The equivalent figure for Laser 1 was 105 arrests per year.

Figure 6.9: Arrest rate per FTE by force for officer intercept hours

Force	Arrest	Intercept Hours[33]	Arrest per FTE
Avon & Somerset	343	12,950	51
Cambridgeshire	516	16,694	59
Cheshire	517	12,492	79
City of London	76	8,629	17
Cleveland	393	6,394	118
Greater Manchester	914	18,321	96
Hampshire	387	12,184	61
Hertfordshire	280	6,300	85
Kent	351	9,153	74
Lancashire	776	20,792	72
Leicestershire	599	14,096	82
Lincolnshire	515	10,818	91
Merseyside	665	7,168	178
Metropolitan	1,406	21,757	124
North Wales	862	11,728	141
North Yorkshire	258	8,854	56
Northamptonshire	1,152	16,864	131
Northumbria	334	9,849	65
Nottinghamshire	601	6,448	179
Staffordshire	477	12,125	76
Warwickshire	254	11,834	41
West Midlands	1,387	17,106	156
West Yorkshire	436	12,718	66
Total/Average	**13,499**	**285,271**	**91**

6.3.3 Database productivity

Figure 6.10 shows that of the 7,319 arrests from ANPR triggers, 28% came from PNC, 38% from DVLA no VED, 11% from No current keeper database and 24% from local databases. These percentages vary by arrest type, with robbery arrests being triggered primarily by PNC hits. Similarly, driving offences are more likely to come about as a result of DVLA no VED hits.

[33] This is the total time intercept officers were in the field, including non-intercept time. This is consistent with the measure used in Laser 1.

Figure 6.10: Arrests by source database for ANPR stops

	Robbery	Theft/ Burglary	Driving	Drugs	S25	Auto crime	Warrant	Other reason	Total
PNC	21	544	317	119	126	530	209	205	2,071
No VED	5	569	738	164	341	147	364	435	2,763
No keeper	5	120	176	51	119	47	92	176	786
Local	2	235	481	177	210	98	241	255	1,699
Total	**33**	**1,468**	**1,712**	**511**	**796**	**822**	**906**	**1,071**	**7,319**
%	0.5%	20.1%	23.4%	7.0%	10.9%	11.2%	12.4%	14.6%	100.0%

For arrests originating from observations, the profile of arrests is somewhat different. Figure 6.11 shows that while the most prominent arrest type relates to driving offences, the next most common arrests are for other reasons and for warrants – this suggests that there is much to be gained by using the 'policeman's nose'. Given that the 'other observations' category includes primarily intercept officers being suspicious of a particular vehicle or driver, it is interesting to note that this category delivers the most arrests.

Figure 6.11: Arrests by source database for observation stops

	Robbery	Theft/ Burglary	Driving	Drugs	S25	Auto crime	Warrant	Other reason	Total
Mobile phone offence	0	8	15	4	5	1	11	4	48
No Seatbelt	0	26	56	25	36	19	39	33	234
VED	5	129	296	80	139	48	188	137	1,022
Vehicle Defect	0	12	53	14	27	19	21	28	174
Driving manner	0	68	231	33	49	93	69	82	625
Known person/vehicle	11	92	157	31	24	59	132	78	584
Other observation	29	460	804	409	410	325	446	610	3,493
Total	**45**	**795**	**1,612**	**596**	**690**	**564**	**906**	**972**	**6,180**
%	0.7%	12.9%	26.1%	9.6%	11.2%	9.1%	14.7%	15.7%	100.0%

Finding 42. During Laser 2, ANPR hits accounted for 56% of vehicle stops and generated 54% of arrests. The profile of these arrests, however, was different to that of observation generated stops, in particular ANPR lead to more arrests for theft and burglary.

6.3.4 Arrest type by age of vehicle

In section 4.3.6 above, it was shown that the year when a vehicle was first registered was a strong factor in determining if was stopped and why it was stopped. Figures 6.12 and 6.13 show that when a vehicle was first registered was also strong indicator both of the number of arrests per 100 stops as well as the type of arrest.

Figure 6.12: Arrests by type by estimated year of registration

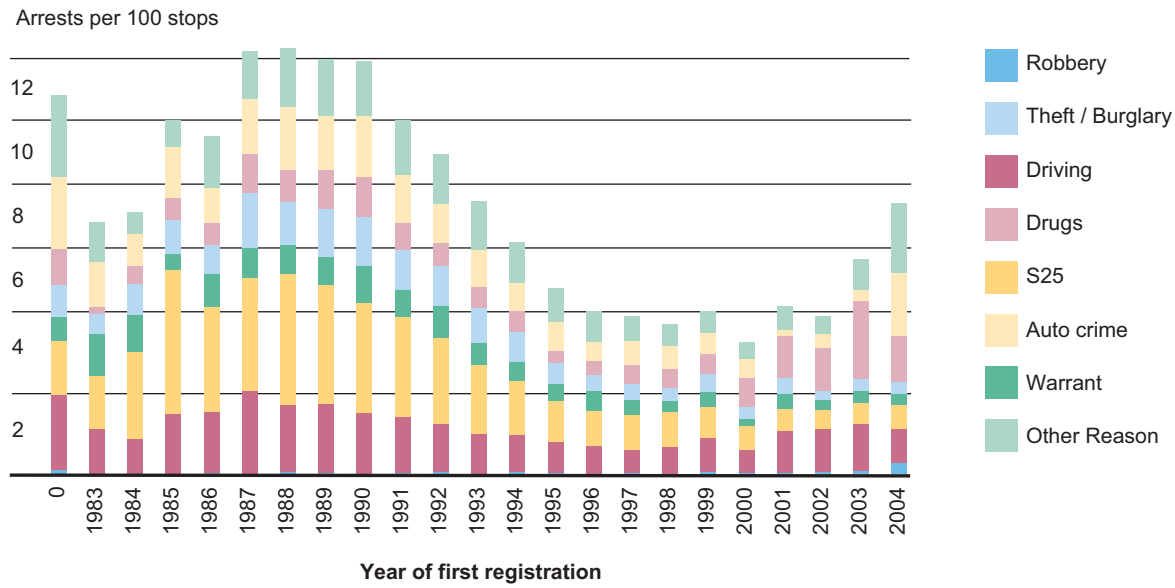
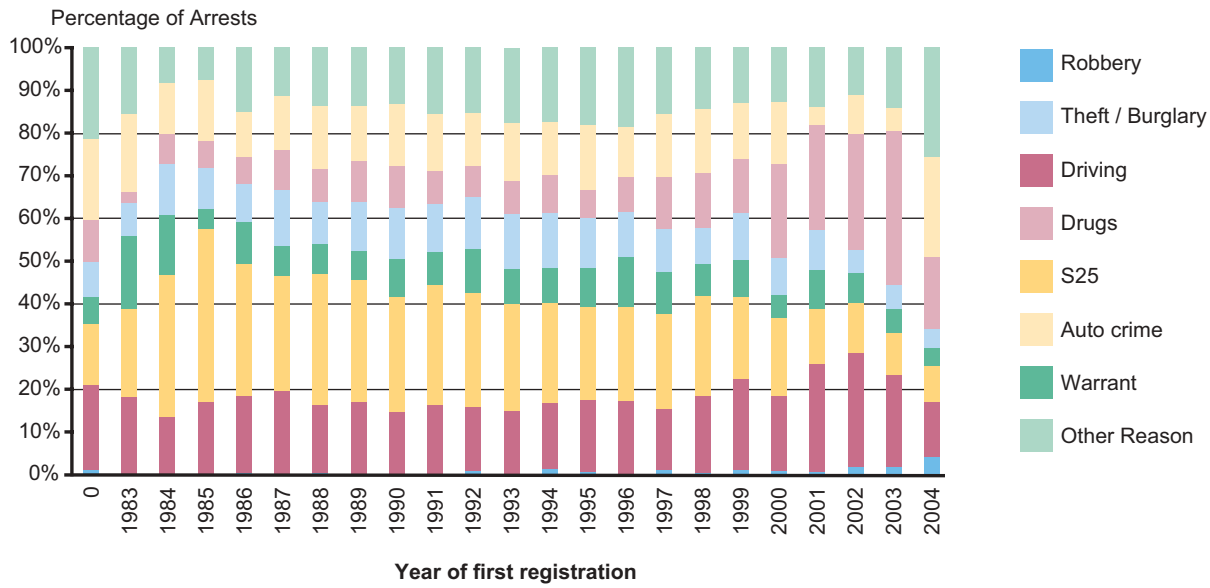


Figure 6.13: Percentage of arrests by type by estimated year of registration

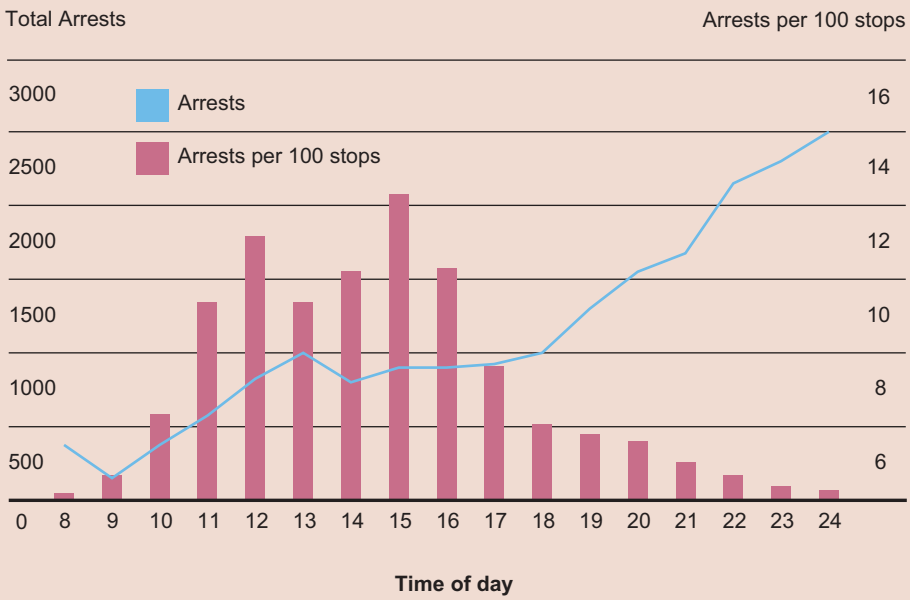


Stopping vehicles registered in 1988 was more than 3 times as likely to lead to an arrest than stopping those vehicles registered in 2000. It is also worth noting that the type of arrest also varies by year of car. Predictably, auto crime arrests are more likely in newer vehicles (as these cars are more valuable), while arrests for driving offences are most likely to arise from stops of older vehicles.

6.3.5 Arrests by time of Day

Both the time and location of deployment can play an important role in making ANPR productive. Figure 6.14 shows that while the majority of arrests take place between 11:00 and 16:00, the more productive times for intercept were between 20:00 and midnight. (Note: the number of stops between midnight and 8am was minimal).

Figure 6.14: Arrests by time of day



6.3.6 Arrest by location

As has already been mentioned, the selection of an appropriate location has an important role to play in successful ANPR operations, both in terms of volume and type of arrest. Figure 6.15 shows the ten most productive postcodes in terms of arrests throughout the life of the pilot.

Figure 6.15: The ten most productive postcodes during Laser 2

Postcode	Force	Total arrests	Arrests per 100 stops at postcode
NN1	Northamptonshire	349	25.1
LL18	North Wales	258	8.2
DA1	Kent	223	4.9
WA8	Merseyside	188	12.7
CH5	North Wales	151	9.2
BB1	Lancashire	139	7.1
PE1	Cambridgeshire	134	8.7
ST4	Staffordshire	132	10.4
CT4	Kent	125	2.3
B20	West Midlands	124	19.5

Areas where CCTV systems were in operation (such as Northamptonshire, Kent, and Staffordshire) appeared to be very productive. This is likely to be a reflection of the fact that more intercept hours are spent at these locations. When intercept hours are taken into account, location is not a determinant of success.

6.3.7 Arrest case studies

While the above arrest analysis shows the quantities of arrests, it does give any indication as to the quality of arrest. By way of example a number of case studies provided by the ANPR-enabled intercept teams are included below. These are from a variety of originating databases. Further examples, as reported on force websites, are included as Appendix E to this document.

- In December 2003 during an ANPR operation, a CCTV camera registered a PNC hit on a 4×4 vehicle. The vehicle was suspected of using false number plates having previously gone through a speed camera in Surrey. Following a search, several offensive weapons and class A drugs were recovered. Furthermore, the chassis number on the vehicle could not be found on PNC. The driver was arrested and a search of his home led to the recovery of more drugs, a pump action shotgun and another stolen 4×4 vehicle

- A Renault Laguna triggered an ANPR hit against a local intelligence database, the information being that the occupants were suspected of being involved in the supply of controlled drugs. As the intercept officer drew alongside the vehicle, he saw the driver rapidly drinking water from a bottle. The vehicle was stopped and the two male occupants searched with a negative result. However, the officers detained the men for a strip search. While being conveyed to the custody suite for this purpose, one of the males began vomiting, which resulted in 15 wraps of heroin being brought up. Both men were arrested for being involved in the supply of controlled drugs and in addition £815 in cash was recovered

- Information, including part of a vehicle registration number, was received from a neighbouring force relating to a recent Post Office robbery. The ANPR team, which was operating close to their force border, searched recent vehicle reads on their ANPR system and identified a possible match. This was circulated and the vehicle stopped by two ANPR motorcyclists within 30 minutes of the initial intelligence circulation. White overalls, masks and a baseball bat were found in the vehicle and the two occupants were arrested and subsequently charged with robbery and theft of a motor vehicle

- Following a DVLA no VED hit, a vehicle was intercepted and the driver's details taken. A check through civilian warrants revealed that there were a number of outstanding fine default warrants. The man was arrested and taken to the custody station. When he was told how much was outstanding he said something to the effect of "the stupid b*****d". It later transpired that he and a friend had agreed to provide each other's details if stopped by the police. What he failed to realise was that his friend was wanted on warrant. When his correct details were obtained, he was found to have been a disqualified driver

- A Mini Metro passed through an ANPR intercept site and showed as a hit on a local database. Intelligence suggested that this vehicle had been spotted the previous week in suspicious circumstances and that it was likely to be used by a gang of local shoplifters. The vehicle was stopped and checks made on the occupants. A search of vehicle led to the recovery of a large quantity of brand new clothing items, all with Marks and Spencer tickets. The occupants were arrested and subsequent enquires revealed that the items had been stolen that morning from a local branch of Marks and Spencer

- In June 2004, a Golf TDi drove through a check site and activated a PNC warning that the vehicle may be using false number plates. Following a short pursuit, officers stopped the vehicle and examination revealed the vehicle to have been stolen from the Manchester area. The driver was arrested for stealing the vehicle and intimated that he was on route to East Midlands airport to collect his co-offender. Officers arrived at the airport in time to arrest the second offender as he came through customs. Both men are prolific offenders

- A Rover car was identified by ANPR (PNC) as being stolen from a burglary. A pursuit ensued during which a carrier bag containing a loaded handgun was thrown from the vehicle. Shortly afterwards a second stolen vehicle was identified containing 5 persons, believed to be connected to the first. Due to the ongoing pursuit this vehicle was lost. The Rover car was eventually stopped and the driver and front passenger arrested for taking the car without consent and for possession of a firearm. While awaiting recovery a mobile phone rang in the car. An officer answered and arranged to meet the owner. 5 people turned up and were arrested for involvement in taking the car without consent. During processing one of the prisoners was found to have a Honda key for which he could not account. A quick trip to the car pound established that the key fitted a recently recovered stolen Honda Civic. It is believed that the persons arrested were en-route to exact revenge for a stabbing that had occurred earlier that day
- A vehicle passing the ANPR checkpoint activated the DVLA no VEL database. The vehicle was stopped and the officer noticed the driver trying to secrete a package down her trousers. All four occupants were detained for a drugs search and were subsequently arrested in possession of approximately £200 worth of heroin and cannabis and £400 in cash. During a search of the premises of the arrested parties, a man who had been wanted for approximately two months for supplying crack cocaine was found and arrested.

Finding 43. The ANPR-enabled intercept teams made a number of very significant arrests. Arrests were not just for vehicle documentation crime but for more serious crimes. It is not possible to quantify the quality of these arrests, however the case studies give some indication as to the value of ANPR in addressing serious crime.

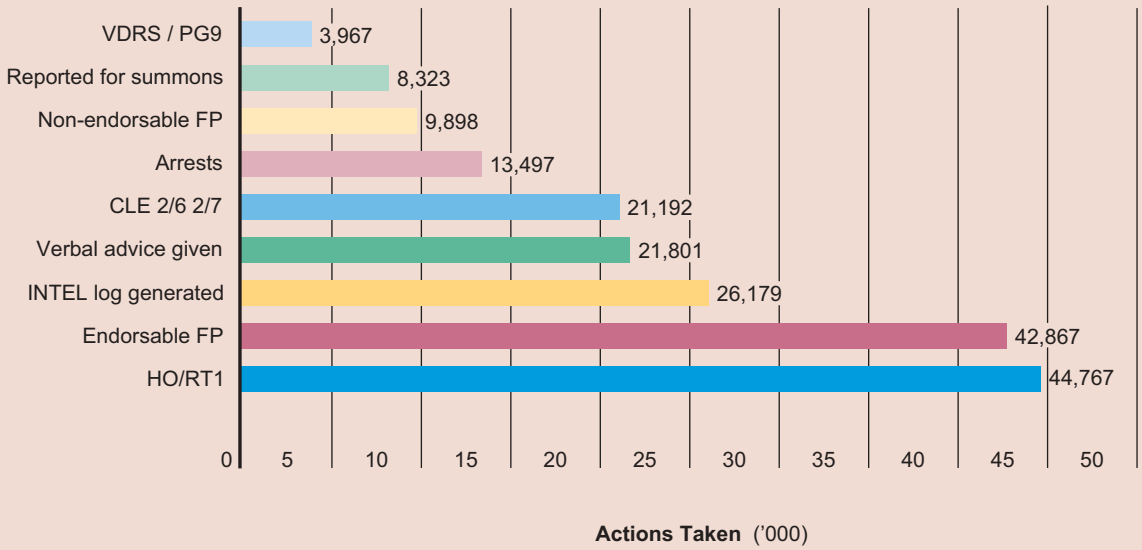
6.4 Other actions

In addition to arrests, ANPR-enabled intercept officers were able to report individuals for summons, issue a fixed penalty, issue a note requiring follow-up action, give some verbal advice and/or prepare an intelligence log.

Finding 44. Of the 180,543 vehicle stops, in 117,492 cases (65%) the intercept officers took some form of action. This is higher than the equivalent figure for Laser 1 (61%). Analysis showed that the proportion of stops resulting in some form of action improved slightly during the last 2 months of Laser 2.

Figure 6.16 shows the total number of actions taken during the pilot. It should be noted that officers were able to take multiple actions – for example a vehicle stop could lead to an non-endorsable fixed penalty, the driver being issued with a request to provide their vehicle documentation at a police station (HO/RT1) and an intelligence log being created.

Figure 6.16: Actions taken by intercept officers



Finding 45. Overall, intercept officers took 192,491 actions with respect to 117,492 vehicle stops where an action was taken, ie approximately 1.6 actions per vehicle where an action was taken. Analysis showed the number of other actions taken per 100 vehicles stopped increased marginally during Laser 2.

The most commonly taken action (excluding arrests and fixed penalty notices) was issuing a HO/RT1 (44,767 issued). The process is usually necessary when a driver is unable to provide documentation such as a driving licence, MOT or insurance at the roadside. The normal process is for those drivers to be issued with an HO/RT1 and asked to produce their details at a local police station.

On average, an HO/RT1 was issued to 26% of all vehicles stops, though this varied by force – in the West Midlands, 62.4% of vehicles stopped were issued with a HO/RT1 while in the Metropolitan Police Service, this figure was only 9%. The HO/RT1 process can also lead to conditional offer tickets being issued. This came into effect in October 2003 but not all forces were able to issue these. Where available, there were 336 conditional offers for no insurance and 316 for no MOT issued with 33 and 65 paid respectively.

Non-endorsable Fixed Penalty notices were issued at 42,867 stops (24%). Furthermore, Endorsable fixed penalty notices were issued at 9,898 stops (5%). It is worth remembering that for many stops, more than 1 ticket was issued and that while officers primarily issued the fixed penalties that could be hypothecated for ANPR, there were other tickets that could be issued (such as speeding) which did not come under the umbrella of ANPR offences. A more detailed view of the fixed penalty notice issuing information is covered in the next section along with the cost recovery elements of Laser 2.

In total 26,179 intelligence logs were created during the pilot. Again this varied significantly by force. Given that these intelligence logs may be used by officers not part of the intercept and potentially over a number of years, it is extremely difficult to quantify the value of these logs.

Figure 6.17 overleaf lists the key actions taken per 100 vehicle stops by force.

6.4.1 Vehicle seizure

A number of forces extended their ANPR operations to include the seizure of vehicles. Following legal advice, West Yorkshire police embarked on a scheme of recovering uninsured vehicles. These are seen to be widely involved in serious crime and posed a great threat to the public. If a driver was found to be uninsured during a stop, he/she was prohibited from continuing their journey and informed that the vehicle needs to be removed from the road within 30 minutes. If the driver could not arrange this, West Yorkshire police recovered the vehicle at the driver's expense. Between September 2003 and April 2004 they recovered more than 700 vehicles and experienced a drop in crime in the area. The view of officers on this operation was that criminals were having their vehicles taken from them and were therefore less effective as a result. This suggests a further way in which ANPR intercept teams can potentially impact on criminality. The findings of the Greenaway report, published in August 2004, support this view and the DfT have already embarked on a campaign that supports police to tackle the problem of uninsured driving.

Under powers from DVLA, West Midlands Police have also begun seizing untaxed vehicles. From the spring of 2004, more than 500 vehicles have been recovered.

Figure 6.17: Actions taken per 100 vehicle stops by force

		Follow up action required by driver				Fixed penalties		other action					
	Arrests	H0/RT1	CLE 2/6 2/7	CLE 2/8/ V62	VDRS/ PG9	NEFPN	EFPN	Reported for summons	Intel logged	Verbal advice given	No Action taken	Occasion action taken	Vehicles stopped
Avon & Somerset	4.7	35.3	2.8	15.0	3.1	18.6	4.8	2.1	11.2	29.4	26.2	74%	7,354
Cambridgeshire	5.6	27.9	0.3	8.4	0.5	26.1	3.5	1.4	6.0	5.4	43.7	57%	9,286
Cheshire	10.1	13.1	0.3	21.8	0.2	24.0	5.0	1.4	27.1	16.6	28.1	72%	5,111
City of London	3.0	10.9	0.7	4.8	2.0	60.1	10.8	1.4	10.3	4.8	10.7	90%	2,562
Cleveland	11.4	50.9	0.1	5.4	4.6	44.5	11.6	6.3	29.2	1.7	7.4	93%	3,446
Greater Manchester	5.8	19.8	1.8	4.2	0.6	10.1	1.7	6.0	6.8	8.8	55.2	45%	15,787
Hampshire	6.0	20.0	0.6	2.5	3.1	30.7	7.3	3.1	14.8	10.9	33.1	69%	6,439
Hertfordshire	5.0	29.2	1.5	1.1	1.4	35.4	6.8	1.2	10.5	12.5	33.5	67%	5,640
Kent	3.5	9.0	4.3	4.0	2.6	16.6	1.2	3.1	8.1	26.1	41.1	59%	10,143
Lancashire	6.7	31.3	4.9	6.5	7.0	42.6	7.3	1.9	6.1	13.4	12.6	88%	11,525
Leicestershire	6.1	25.6	0.1	9.3	0.9	15.3	4.9	7.7	23.3	3.2	45.5	55%	9,848
Lincolnshire	4.5	13.9	0.4	6.7	2.3	20.5	1.2	1.4	7.9	5.1	58.7	44%	11,533
Merseyside	9.8	33.4	2.6	20.5	0.9	24.4	5.0	7.7	10.1	11.0	39.8	61%	6,756
Metropolitan	7.8	9.7	2.1	13.4	1.5	6.7	7.5	8.5	10.4	9.5	44.8	56%	18,034
North Wales	7.8	24.9	0.4	20.9	2.7	38.5	7.8	3.0	5.5	4.9	36.5	65%	11,005
North Yorkshire	5.7	29.3	1.8	7.6	3.9	26.0	2.2	2.5	12.7	20.9	31.6	69%	4,498
Northamptonshire	16.5	25.3	3.9	4.0	0.8	19.9	8.1	1.4	27.2	31.0	19.7	81%	6,998
Northumbria	8.3	26.7	0.3	0.0	1.4	11.9	3.0	1.3	0.2	11.5	50.2	51%	4,021
Nottinghamshire	22.5	14.3	1.9	0.9	2.1	38.8	42.8	5.2	56.5	4.3	5.5	96%	2,676
Staffordshire	8.3	27.7	4.9	15.7	1.2	30.3	5.0	18.6	28.1	10.7	21.4	79%	5,771
Warwickshire	5.4	28.5	0.1	21.7	3.7	20.8	3.8	9.6	9.8	9.0	37.5	63%	4,727
West Midlands	15.8	62.5	12.3	0.0	4.4	36.0	3.5	4.6	55.6	5.1	10.4	96%	8,747
West Yorkshire	5.1	28.5	3.5	12.3	1.0	19.6	3.8	4.0	8.1	23.5	43.3	59%	8,636
Laser 2 Total/Average	**7.5**	**24.8**	**2.5**	**9.3**	**2.2**	**23.7**	**5.5**	**4.6**	**14.5**	**12.1**	**36.0**	**65%**	**180,543**
Laser 1 Total/Average	**7.8**	**42.3**	**14.7**	**14.2**	**2.6**	**2.3**	**0.9**	**5.2**	**26.4**	**8.2**	**39.4**	**61%**	**39,188**

Findings: Database issues

This section of the evaluation sets out the results, that is to say the actions that arose from the intercepts. In total, including stops from both ANPR hits and observation, we have records of the actions taken from over 180,000 vehicle stops.

1. Good intelligence is at the heart of modern policing: [Section 7.1]

- Laser 1 identified a number of weaknesses in national databases, principally with regard to the vehicle licensing. A number of initiatives were put in place but quality remains an issue
- there are a number of concurrent pressures to improve the quality of national and local intelligence, but much more remains to be done
- PNC and local databases were found to be around 80% accurate compared to around 40% for DVLA
- Accuracy of DVLA databases declined over the study period

2. Teams will become more efficient as the quality of intelligence improves: [Section 7.2]

- improvements to the database accuracy (particularly DVLA) will lead to more efficient targeting of resources. Nevertheless, as we have seen, around half of all ANPR arrests were as a result of hits from No current keeper or no excise databases

3. Improving conversion rates: [Section 7.2]·

- the greatest conversion rate (hits to arrests) for ANPR database was, not surprisingly, PNC – 19.6% of all hits resulted in arrests·
- the greatest conversion rate for observation was the category 'known vehicles or criminals' – 36.3% of all stops resulted in arrests.

7.1 Context

7.1.1 Laser 1 evaluation

The use of ANPR-enabled intercept teams is a prime example of an intelligence-led policing tool – police using existing intelligence sources to direct their activities. As identified above in section 6, targeting of police resources has produced excellent results. However, the most critical factor that contributed to the effectiveness of ANPR teams was the underlying intelligence on which the stops were based.

The Laser 1 evaluation highlighted inadequacies in the accuracy[34] of the various intelligence databases, in particular DVLA's No VED and No current keeper, and outlined a number of possible reasons for these inaccuracies. The report identified that DVLA were undertaking a number of measures to improve data accuracy, for example the introduction of bar-coded V11 forms, barcode readers in Post Offices and the introduction of continuous registration. However it went on to identify that there was a lack of in-depth understanding as to the cause of these inaccuracies and concluded that this represented a weakness that should be addressed.[35]

7.1.2 Intelligence sharing

The Bichard inquiry report highlighted general weaknesses in the use and sharing of intelligence by police. In the context of this report, it is clear that as an intelligence-led policing tool the effectiveness of ANPR in engaging level 2 and 3 criminality will be limited by the availability of good quality and timely intelligence across force boundaries. In the light of the Bichard findings, police must make greater effort to effectively use and share intelligence across force boundaries.

To address these issues, the Government is taking forward a number of actions including:

- the introduction of a National Police Intelligence Computer system (entitled 'IMPACT'). This will ensure that all forces use the same system to manage and share intelligence

[34] Database accuracy was recorded by officers stopping vehicles as a result of ANPR hits. Therefore, the accuracy of a database quoted is a reflection of the correctness of the information for those vehicles stopped and checked as recorded by officers.

[35] *Engaging Criminality – denying criminals use of the roads*, PA Consulting Group (October 2003)

- as an interim measure, introducing an easily searchable index of all those persons on whom any police force holds information. This will begin in Autumn 2004 and will be complete by Spring 2005
- a statutory code of practice on police information handling, introduced by the end of this year to enable all 43 forces to deal with intelligence information in the same way. This will link closely to NIM.

These recommendations should ensure that the overall quality of intelligence collated and maintained by the police is improved and that this intelligence is shared more effectively. While the actions relate specifically to persons, there is latitude to include vehicles associated with these persons and therefore further exploit ANPR. In this context, the establishment of a national data warehouse of vehicle intelligence, including ANPR reads and hits as a further source of intelligence, is a critical step forward and must form part of an overall national intelligence management solution.

7.2 Data sources

7.2.1 Background

During the pilot, the ANPR readers were used with a variety of data, including:

- **PNC** Vehicles Index, which was provided daily or available on-line to some intercept teams
- DVLA's databases of **No current VED** and **No current keeper**.
  Both databases were provided to the forces by DVLA on a monthly basis. However because of the time delay between VED discs being purchased and the DVLA systems being updated, the no VED database only included those vehicles that had been without VED for two months or more.
  In practice this meant that some vehicles without VED would be missed
- **local or other ad hoc databases**. These varied from force to force and included:
  - Customs and Excise databases, for example tobacco bootleggers
  - outstanding speed camera tickets
  - regional stolen vehicle databases, for example ELVIS which covers Merseyside
  - PIKE, a national database of LGV and commercial vehicles of interest
  - Vehicle and Operator Services Agency (VOSA) databases.

For this pilot, the source of each database hit was recorded by the intercept officers, namely PNC, No current VED, No current keeper or other force database. Due to space limitations on the data collection pro forma used by the intercept officers, it was not possible to record the source data for 'other force databases'.

7.2.2 Vehicle stops by source

Figure 7.1 shows the accuracy of the ANPR data (as recorded by the officer who made the stop) for the 101,775 vehicles stopped as result of database hits. For example, 14,547 vehicles were stopped due to a PNC flag; of these, on 79% of occasions the information that led to the stop was deemed by the officer making the stop to be accurate. It is important to note that Figure 7.2 shows the accuracy of the ANPR data for those vehicles stopped, not the overall accuracy of the databases (as this would have required all vehicles to be stopped and checked).

Finding 46. During Laser 2, 111,637 checks against the intelligence databases were made during the 101,775 ANPR stops. Overall, the intelligence databases were shown to be accurate on 52% of occasions, with local force databases and PNC most likely to be accurate (83% and 79% respectively), while DVLA databases least likely to be accurate (combined accuracy of 40%).

Finding 47. Since Laser 1, the accuracy of all ANPR databases has fallen – accuracy of local databases fell from 93% to 83%, PNC fell from 83% to 79%, and, in spite of a number of developments in the DVLA databases, No current keeper from fell 53% to 41% and no VED fell from 51% to 40%.

Figure 7.1: Accuracy of information for vehicles stopped by force

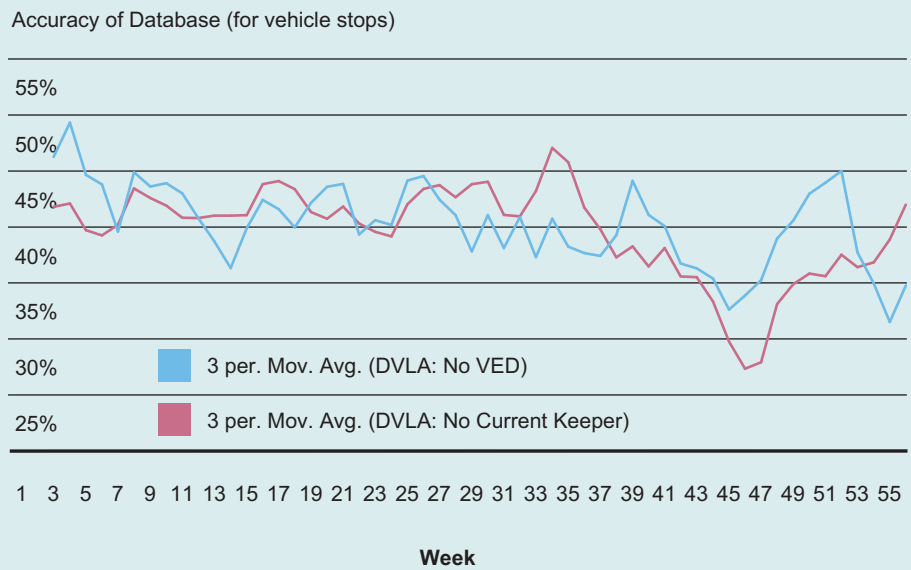
	DVLA No VED		DVLA No current keeper		PNC flag		Local Force Database	
	Hits	Accuracy	Hits	Accuracy	Hits	Accuracy	Hits	Accuracy
Avon & Somerset	1,081	37.0%	1,999	40.5%	1,478	79.6%	234	88.0%
Cambridgeshire	2,682	28.8%	858	30.5%	668	64.5%	1,299	76.5%
Cheshire	1,502	58.9%	258	69.8%	381	79.8%	1,211	83.7%
City of London	153	80.3%	178	81.7%	177	86.7%	185	95.1%
Cleveland	815	66.7%	39	56.4%	101	84.1%	452	90.9%
Greater Manchester	6,769	28.5%	2,905	28.6%	972	57.0%	2,626	56.0%
Hampshire	1,757	46.6%	682	48.6%	560	69.4%	380	79.4%
Hertfordshire	1,045	41.4%	615	51.8%	372	85.5%	386	83.4%
Kent	3,838	37.3%	1,702	35.8%	793	80.3%	472	90.0%
Lancashire	1,595	67.0%	833	71.1%	334	83.5%	988	90.7%
Leicestershire	4,050	44.2%	1,028	58.7%	896	88.0%	2,529	92.4%
Lincolnshire	4,651	15.8%	2,864	12.2%	477	53.9%	711	84.5%
Merseyside	3,311	40.1%	314	50.2%	411	75.2%	710	85.6%
Metropolitan	4,598	46.7%	4,781	46.3%	2,105	81.4%	640	83.4%
North Wales	2,928	44.1%	321	58.3%	355	80.7%	909	90.4%
North Yorkshire	1,036	29.9%	671	30.4%	239	53.6%	391	72.6%
Northants	2,694	42.3%	543	48.9%	1,014	77.7%	867	91.9%
Northumbria	2,026	19.1%	678	29.6%	134	65.7%	893	91.4%
Nottinghamshire	229	87.7%	237	96.2%	331	91.5%	431	95.6%
Staffordshire	1,603	51.1%	27	63.0%	301	80.1%	875	88.3%
Warwickshire	1,700	68.8%	557	80.1%	481	94.6%	454	89.4%
West Midlands	1,897	98.5%	1	100.0%	1,455	99.9%	450	99.6%
West Yorkshire	4,097	21.4%	284	35.7%	518	64.0%	579	86.9%
Total	56,053	40.1%	22,370	40.6%	14,547	78.8%	18,668	83.3%

Finding 48. There was significant variation in database accuracy across forces, in particular for the national DVLA databases. This is surprising given that there is, in principle, a consistency of approach in data collection. In some cases, this could be explained by differing work practices. For example, some forces chose to verify visually if a vehicle had a valid tax disc before deciding to stop on the basis of a No VED hit. (In most cases a visual inspection can check for failing to display a valid VED disc, while the ANPR read checks if a vehicle has been taxed.) However, this would not explain the difference in accuracy between forces in the No current keeper database.

The Laser 1 report highlighted the poor accuracy of the DVLA databases as a factor in restricting the effectiveness of intercept teams. As part of their on-going modernisation programme, DVLA introduced bar codes onto tax discs during 2003 – this would allow for faster, more accurate updating of records. Furthermore, pending CJX accreditation for the DVLA will enable the electronic transmission of this database to forces on a daily basis. This could deliver a significant boost to the accuracy of the DVLA VED database when it is used in ANPR operations.

As identified in section 2.5.2, in February 2004 DVLA began enforcing vehicles that did not have continuous registration. Both developments were identified as key to improving vehicle keeper details and information on vehicles that were not taxed. Figure 7.2 shows the accuracy of the two DVLA databases (as recorded from vehicle stops) during the Laser 2 pilot.

Figure 7.2: Accuracy of DVLA databases for vehicles stops (moving average over 3 weeks)

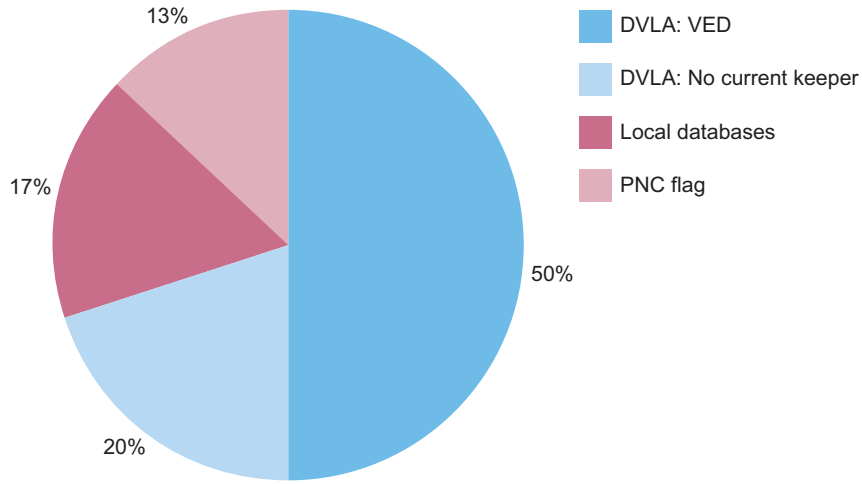


Finding 49. The accuracy of the no VED and No current keeper databases varied throughout the pilot, with an overall drop in quality between June 2003 and February 2004. While there has been a slight improvement in data quality since April 2004, given the wide week-on-week variations, it is too early to say whether this improvement will be sustained.

Finding 50. Laser 2 confirmed the inadequacies of existing intelligence databases raised in Laser 1, both in terms of overall poor quality data and significant variations in data quality between areas. The DVLA databases in particular were shown to be poor. Because of this, many forces made a visual inspection of vehicles (sometimes using video images to help) for a VED tax disc before a vehicle was stopped. Where a valid tax disc was clearly visible, the vehicle was not stopped

Figure 7.3 shows that in spite of the poorer data quality, the two DVLA databases led to the largest number of valid stops.

Figure 7.3: Source database for valid vehicles stops



Finding 51. Approximately 70% of valid vehicle stops originated from the two DVLA databases. In this respect, the DVLA data was a key element to the operation of ANPR-enabled intercept teams.

ANPR provided 56% of the stops and approximately 54% of all arrests. Figure 7.4 shows stop reason and arrests rate per 100 vehicle stops for observations and ANPR stops.

Figure 7.4: Accuracy of database for vehicle stops

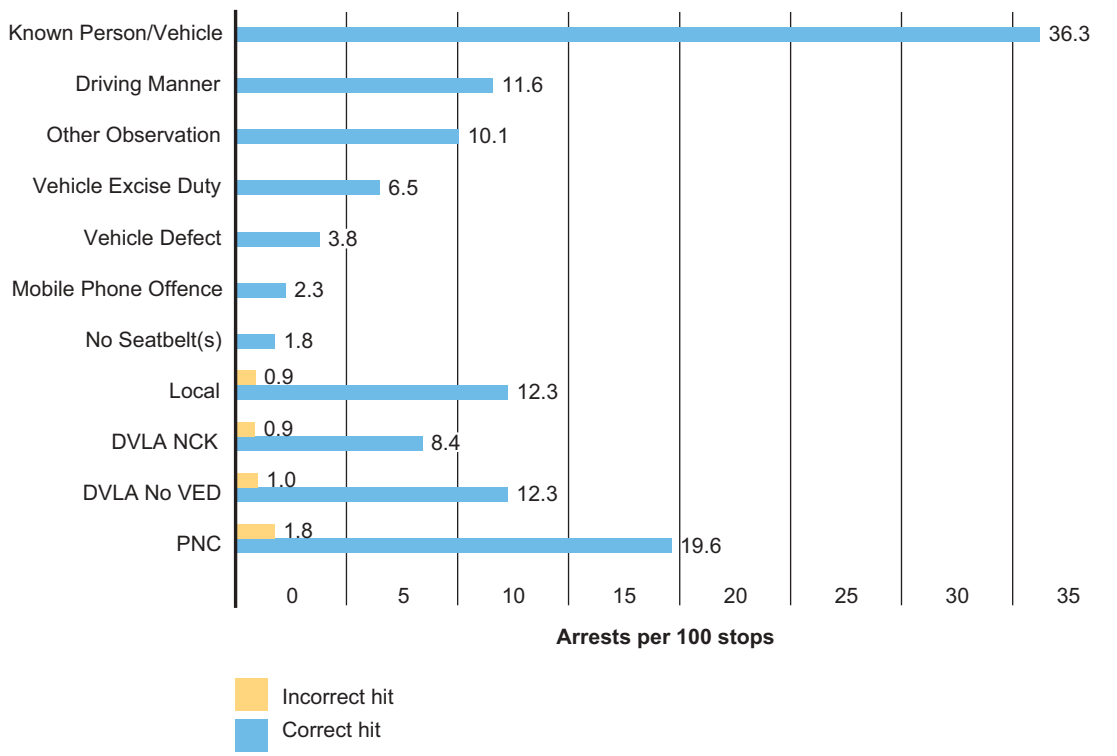


Figure 7.4 shows that observation by an officer of a known person or vehicle was most likely to lead to an arrest – over 36 arrests per 100 vehicle stops. A correct PNC hit was the next most productive hit, leading to 19.6 arrests per 100 vehicle stops. Somewhat surprisingly, the no current VED database yielded 12.3 arrests per 100 vehicles stops when there was a correct hit – as many as the local force intelligence database. Accuracy of the database was clearly important since incorrect hits generated only 10% of the arrests of a correct hit.

Finding 52. Correct ANPR hits were one of the most effective means of generating arrests per 100 stops. Correct ANPR hits yielded approximately ten times more arrests than incorrect hits – this stresses the importance of data quality in driving performance.

The quality of the DVLA databases declined between the 6 month pilot that began in September 2003 and the current ANPR evaluation period. Had the no VED and No current keeper databases been as clean in Laser 2 as they were in Laser 1, the number of arrests generated by these databases would have been greater. Using 12.3 arrests per 100 stops identified by a correct VED hit, there would be an improvement in the database quality to 51% (the level it was in Laser 1) with an additional 685 arrests. Similarly, if the No current keeper database was the same level of accuracy as per Laser 1, this would contribute a further 214 arrests.

Finding 53. If the DVLA databases had maintained their accuracy achieved in Laser 1 during Laser 2, arrests per 100 stops during Laser 2 would have been 8.0, higher both than the actual in Laser 2 (7.5) and that achieved in Laser 1(7.8).

Following circulation of initial findings on data accuracy, the DVLA has re-iterated its commitment to providing the police with the most accurate and up to date information available. Phase three of the Barcoding All Relicensing Transactions (BART) Project began a live pilot on the 26 July 2004 and was scheduled to be rolled out to all issuing Post Office branches by the end of August 2004. This phase of the project sees the addition of the V10 (vehicle licence renewal application) to the BART system and the provision of an on-line enquiry link between Post Office branches and DVLA. This will greatly reduce the number of incorrect hits over the next few months. Furthermore, the DVLA acknowledges that links between the agency and the police via a CJX (Criminal Justice Extranet) would greatly improve data transfer and they are actively working to speed up such a connection.

Findings: Cost recovery

This section of the evaluation provides a summary of the costs and benefits of the ANPR operation across the 23 forces.

The costs of ANPR enforcement

- the 23 forces are recovering some of the enforcement costs from the penalties paid for by offending motorists. Strict guidelines govern these arrangements and these are being adhered to [Section 8.2]
- the rapid introduction of the ANPR pilot at the same time as the introduction of new fixed penalties meant that many forces were not able to issue fixed penalties until well into the pilot [Section 8.3]
- some of the larger fixed penalties have had much lower payment rates (due in most part to less severe penalties being available in court) [Section 8.4]
- in general, a higher proportion of fixed penalties were issued to older vehicles [Section 8.4]
- around £1 million of funds were recovered to be recycled into further enforcement (against expenditure of around £12 million). [Section 8.4]

The benefits

- in addition to addressing criminality, the use of ANPR-enabled intercept teams also contributes to wider objectives, specifically road safety and excise collection [Section 8.4].

8.1 Context

8.1.1 Background

Although the results from Laser 1 were extremely encouraging, there were only limited resources available to fund the national roll-out and operation of ANPR.

If the benefits of ANPR were to be maximised within existing budgets, an innovative funding approach was required. Following a submission to HM Treasury, conditional approval was given to test a cost recovery programme for dedicated ANPR-enabled intercept teams from 1 June 2003. This allowed:

- police to target vehicle documentation offences, and crime in general, using ANPR-enabled dedicated intercept teams, maximising the use of and building upon existing intelligence
- the activity to be funded through receipts from fixed penalties issued for vehicle offences detected by the ANPR-enabled dedicated intercept teams.

If certain conditions can be satisfied, HM Treasury can grant permission for Government Departments to recover the costs of enforcement and detection. A case was made and was accepted. This was on the basis of substantial evidence that ANPR contributed to the Home Office policy objectives of tackling criminality.

This therefore allowed the Home Office (the sponsoring Department) a period of two years to pilot the cost recovery programme, assess the benefits and come to a policy decision as to whether the pilot should be rolled out nationally – a decision that would require primary legislation.

8.1.2 The Laser 2 concept

In broad terms, costs are recovered for Laser 2 from Fixed Penalty Notices issued at the roadside by ANPR-enabled intercept teams. In order to separate the fixed penalty receipts from those generated by existing activities by officers, it was necessary to introduce a distinguishing mark/feature on these fixed penalty notices issued. The simplest method was for the ANPR teams to use fixed penalty pads with a special identifier or in a different colour from the rest of the force. In this way, the central ticket offices could separate tickets arising from ANPR teams from other activities.

For each stop, the officer recorded on a roadside collection sheet key information relating to the stop and its outcomes (see appendix B). This information served two purposes: performance evaluation and for auditing fine monies. Information from these sheets was then collated, entered onto a database by the analyst and provided to the PSU on a monthly basis, while the original sheets were kept for audit.

Force central ticket offices then placed an identifier on each fixed penalty that the ANPR team generated when they enter the data onto their system. When the monies had been paid (via the magistrates court), this allowed the relevant fine revenues to be identified and ring fenced for cost recovery. The magistrates' courts pass all fine revenue to the DCA on a monthly basis. The element to be cost recovered was then forwarded onto the Home Office, together with a record stating how the revenue is divided across forces. Appropriate revenue costs were then paid by the Home Office to the forces on a quarterly basis in arrears.

In practice, the FPNs that could be cost recovered fell into the following basic categories:

- endorsable ticket (6 points) and £200 fine: no insurance
- endorsable ticket (3 points) and £60 fine: driving other than in accordance with the licence
- non-endorsable ticket, but £60 fine for no VED
- non-endorsable ticket, but £60 fine for no MOT
- non-endorsable ticket, but £30 fine: eg no seatbelt, using mobile phone, obscured VRM.

8.2 Conditions of cost recovery

8.2.1 HM Treasury requirements

In the 1998 Public Expenditure Survey, HMT identified certain conditions where fines and penalties could be cost recovered, specifically where:

- performance against policy objectives is likely to be improved
- arrangements are in place to ensure that the activity will not lead to the abuse of fines and penalty collection as a method of revenue rating, and that operational priorities remain undistorted
- revenues will always be sufficient to meet future costs, with any excess revenues over costs being surrendered
- costs of enforcement be readily identified and apportioned without undue bureaucracy, and with interdepartmental and inter-agency agreement, where necessary
- savings can be achieved through the change and there are adequate efficiency regimes in place to control costs, including regular efficiency reviews.

8.2.2 How Laser 2 sought to meet these requirements

In order to ensure that Laser 2 forces met these conditions, the national ANPR Steering Group (which includes representatives from the Home Office, DfT, ACPO, DCA, and HMT) carried out the following:

- put in place an ANPR cost recovery handbook, which set out a number of rules and guidelines to ensure that performance against policy objectives was measured and operational priorities were not distorted. Specifically the rules covered:
  - the objectives of Laser 2
  - the arrangements for cost recovery
  - what fixed penalties were covered by the cost recovery scheme (as per Appendix D)
  - what expenditure was covered by the scheme
  - financial controls and governance arrangements, including efficiency and effectiveness
  - project monitoring
  - asked for written submissions ('operational cases') from forces as to how they planned to operate ANPR-enabled intercept teams within these rules and guidelines
  - requested that each of the forces' ACPO officer sign a letter explicitly agreeing to the rules and guidelines as set out in the handbook as part of their operational case submission.

On this basis, the PSU accepted forces onto the ANPR pilot.

8.2.3 Monitoring arrangements

Where delivery or performance fell below acceptable standards by the National ANPR Project Board, the PSU intervened as follows:

- on the first occasion where there was evidence of under-performance, a representative from Police Standards Unit would visit the force to undertake a high-level review of operations to identify possible reasons for under-performance and agree steps to be taken to remedy these
- if there was ongoing under-performance, a representative from PSU would again visit the force and undertake a more detailed review of operations. Following this, PSU would write to the Chief Officer's representation:

  - setting out the findings of the review
  - detailing actions that must be taken to address these
  - setting out a timetable for delivery of these actions
  - pointing out the consequences of failing to meet
- if there was no noticeable improvement, following this, the national ANPR Project Board reserved the right to suspend a force from the pilot. Prior to doing this, the PSU undertake to give at least one calendar month's notice. In practice this did not prove to be necessary since, as we will see later, following the interventions, normally performance improved.

In terms of what constitutes an acceptable performance, no specific targets were set. However indicative performance measures were:

- number of days per week intercept team(s) operated – the operational inputs
- vehicle stops per hour of intercept officer – the utilisation
- arrests per FTE officer – the effectiveness of the operation
- FPNs issued per FTE officer – cost recovery.

Finding 54. The national ANPR Programme Board set in place robust controls and processes for Laser 2 to help ensure that the HMT conditions for cost recovery were achieved.

8.3 Factors affecting the introduction of cost recovery

In relation to the cost recovery aspect, the following points are worth noting:

- prior to the start of Laser 2, the Home Office relaxed the guidance to allow (ANPR) officers to issue up to three FPNs at a time, though this was limited to one endorsable and two non-endorsable tickets
- on 1 June 2003, the Home Secretary introduced four new fixed penalties, namely:
  - failing to supply details necessary to identify an offending driver, contrary to s172, Road Traffic Act 1998 (RTA), with a penalty of £120
  - having no insurance, contrary to section 143 RTA, with a penalty of £200
  - having no MOT certificate, contrary to section 47 RTA with a penalty of £60
  - not displaying a vehicle excise licence, contrary to section 33 Vehicle Excise and Registration Act (VERA) 1994 was increased to £60.

While this coincided with the start of Laser 2, in practice many forces had not printed the necessary fixed penalty pads for these tickets to be issued. Hence many forces were unable to issue these tickets for a number of months

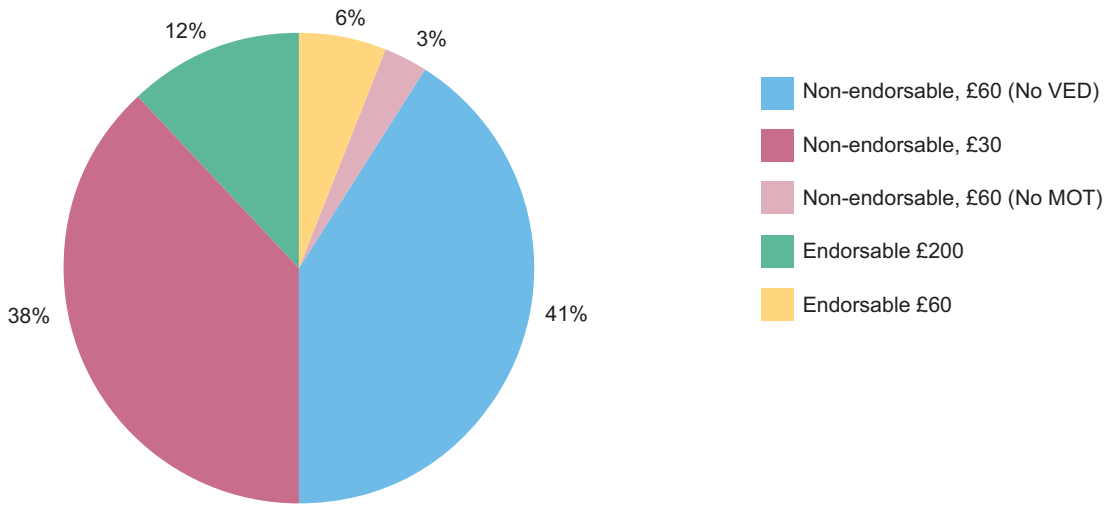
- due to the rapid start to Laser 2 (forces were notified of their inclusion in March 2003 for a June 2003 start), during the initial stages many forces found themselves unable to cost recover from FPNs. Part of this was down to a lack of preparation (tickets books were in some cases unavailable until August 2003) while in other cases it became difficult to differentiate between the tickets that were issued by ANPR teams and those issued by other officers in the force. However, all these issues were eventually addressed with new ticket books becoming available for the new offences
- following negotiations with HMT, from November 2003 forces were allowed to issue Conditional Offers for no insurance or MOT where a HO/RT1 had been issued at the roadside but the driver had failed to produce the relevant documents within seven days. To support this process, forces required an upgrade to their ticketing system. At the end of the pilot period, 12 of the 23 forces had not had carried out this upgrade, while a further two only received the upgrade during June 2004
- on 1 December 2003, the DfT introduced a new FPN offence of using a mobile phone while driving, with offenders subject to a £30 fine. However, ACPO decided that, for the first two months, police forces in England and Wales would issue verbal warnings to drivers instead of issuing a FPN. This was included within the cost recovery process.

8.4 Fixed penalty notices issued and paid

8.4.1 FPNs issued during Laser 2

Since June 2003, Laser 2 intercept teams issued 54,035 FPNs that were cost recoverable to 52,765 drivers, that is to say that there were only a relatively few occasions where more than one FPN was issued to a driver. Figure 8.1 shows the breakdown of tickets by ticket type.

Figure 8.1: FPNs issued by ANPR intercept teams



Overall, the most frequently issued ticket type was a non-endorsable £60 FPN for failing to display VED/no VED (22,825 tickets) and non-endorsable £30 FPNs for a variety of minor offences (20,290). While non-compliance with insurance and no MOT is seen to be as frequent as VED evasion (see section 2.1 above), relatively few FPNs were issued for no insurance (6,299) and no MOT (1,496). This probably reflects the fact that insurance and MOT documentation tends not to be carried by drivers and would be followed up by means of an HO/RT1.

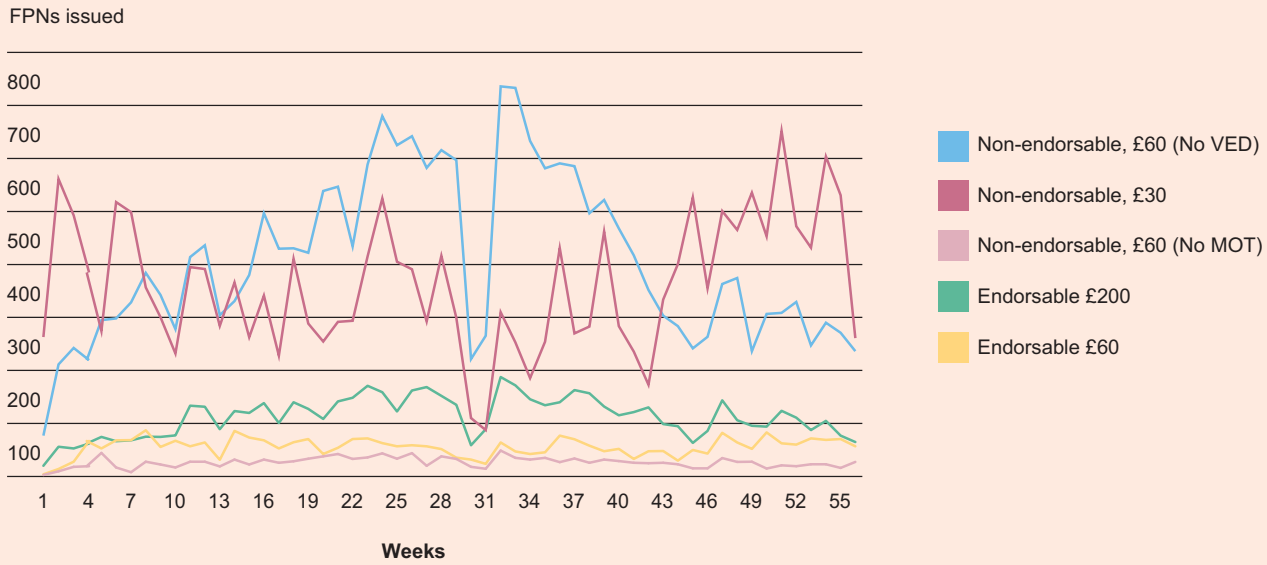
Finding 55. On the basis of the staffing levels reported by forces during Laser 2, in one year a Full Time Equivalent intercept officer would expect to issue:

- **36 endorsable tickets for no insurance**
- **16 other endorsable tickets**
- **9 non-endorsable tickets for no MOT**
- **132 non-endorsable tickets for no VED and**
- **117 non-endorsable tickets (£30)**

This amounts to a total of 310 FPNs per annum. Given that the number of fixed penalties available to officers increased during Laser 2, it may be expected that the actual number is slightly higher than this.

Overall, the number of fixed penalties issued increased from week 1 (367 tickets issued) to a peak in week 25 (1,470 tickets issued) and fell away to around 1,000 per week between weeks 48 to 55. Figure 8.2 shows the number of tickets during Laser 2.

Figure 8.2: FPNs issued by ANPR intercept teams by week



The most significant change in FPN tickets issued was for no VED. The increase from week 1 (when 77 tickets issued) to the peak in weeks 33 and 34 (when 736 and 733 tickets were issued respectively) probably reflects the use of the recently introduced offence of failure to display VED and the growing confidence of ANPR teams to issue tickets for this.

There was significant week-on-week variation in the issue of lower value (£30) non-endorsable tickets, with a slight upward trend after Christmas 2003 – coinciding with police enforcement of mobile phone offences. The issue of other tickets (non-endorsable £60 tickets for no MOT and endorsable £60 and £200 tickets for no insurance) showed a more stable profile, gradually increasing from a low base to stable level around week 13.

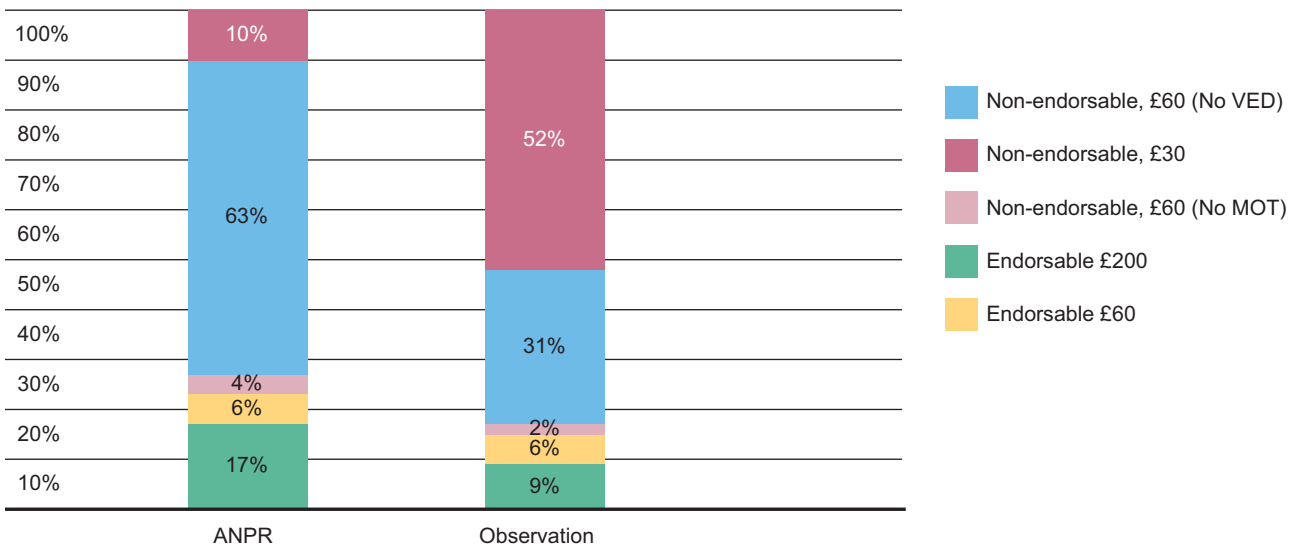
Finding 56. For the two largest volume tickets issued at the roadside (No VED and non-endorsable minor offences, which together accounted for nearly 80% of tickets issued) there was significant variation in the volume of tickets issued during the pilot. In particular the dramatic decline of FPNs issued for no VED to approximately a third of the peak achieved at the beginning of 2004 would suggest a fundamental change – this coincides with both the temporary suspension of the DVLA database (see section 2.5 above) and the introduction of continuous registration (February 2004 – Week 34).

8.4.2 FPNs issued by type of stop generated

In terms of how FPNs were generated, 66% of FPNs issued came from officer observation vehicle stops, while only 34% came from ANPR-generated stops. This finding is unsurprising – £30 non-endorsable and £60 endorsable tickets could not come from ANPR hits alone and currently the data underlying the ANPR systems did not provide vehicle insurance or MOT details.

It was still possible for an ANPR hit to lead to these FPNs being issued – for example a vehicle passing the ANPR may be flagged as having no VED, but when checked an officer may find that the vehicle has recently been taxed. The driver, however, may also have been observed driving without a seatbelt on, and therefore received a £30 non-endorsable FPN. Figure 8.3 shows that the majority of ANPR tickets (63%) were for no VED, while 52% of observation-generated stops were for £30 non-endorsable offences.

Figure 8.3: FPNs issued by intercept source



Finding 57. Only a third of FPNs issued were generated by ANPR intelligence stops as opposed to officer observation. This reflected the data used by forces – primarily a PNC extract and DVLA data. ANPR intercept teams did not have the motor insurance or MOT databases to trigger vehicle stops. These databases are expected to be available in the medium term and will provide another useful intelligence source.

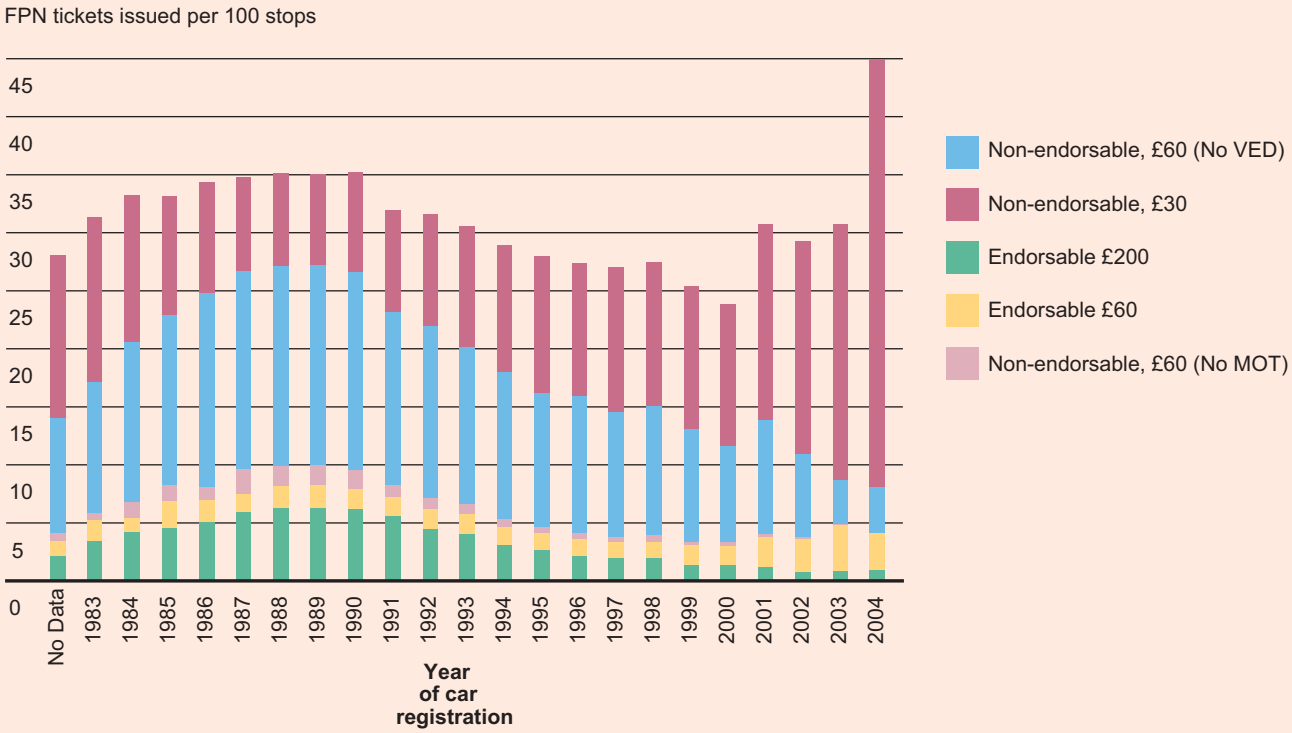
8.4.3 FPNs issued by estimated year of vehicle registration

Figure 8.4 shows the number and type of FPNs issued per 100 vehicle stops by the (estimated) year of vehicle registration. It should be noted that there were very few vehicle stops for vehicles registered in 2004 and results for 2004 are therefore not considered to be significant.

Overall, drivers of older vehicles were more likely to be issued a FPN than drivers of new vehicles, with vehicles registered in 1990 most likely to receive a FPN from an ANPR intercept team. In terms of ticket types, there was also an uneven distribution. No FPNs were issued for failure to have an MOT for drivers of vehicles newer than 2001 – this is logical as an MOT is only a requirement of vehicles older than 3 years. FPNs were more likely to be issued to older vehicle than newer vehicle drivers for no insurance and no VED, while newer vehicle drivers were more likely to receive low value (£30) non-endorsable FPNs (both using a mobile telephone and non seat belt).

Finding 58. Analysis of FPNs issued per 100 vehicle stops by the (estimated) year of vehicle registration confirms existing offender profile information, much of which is already known by traffic officers – older vehicles are more likely to be untaxed and uninsured than newer vehicles. The analysis does, however, confirm and provide useful quantification of this relationship and confirms the strong link with document and volume crime.

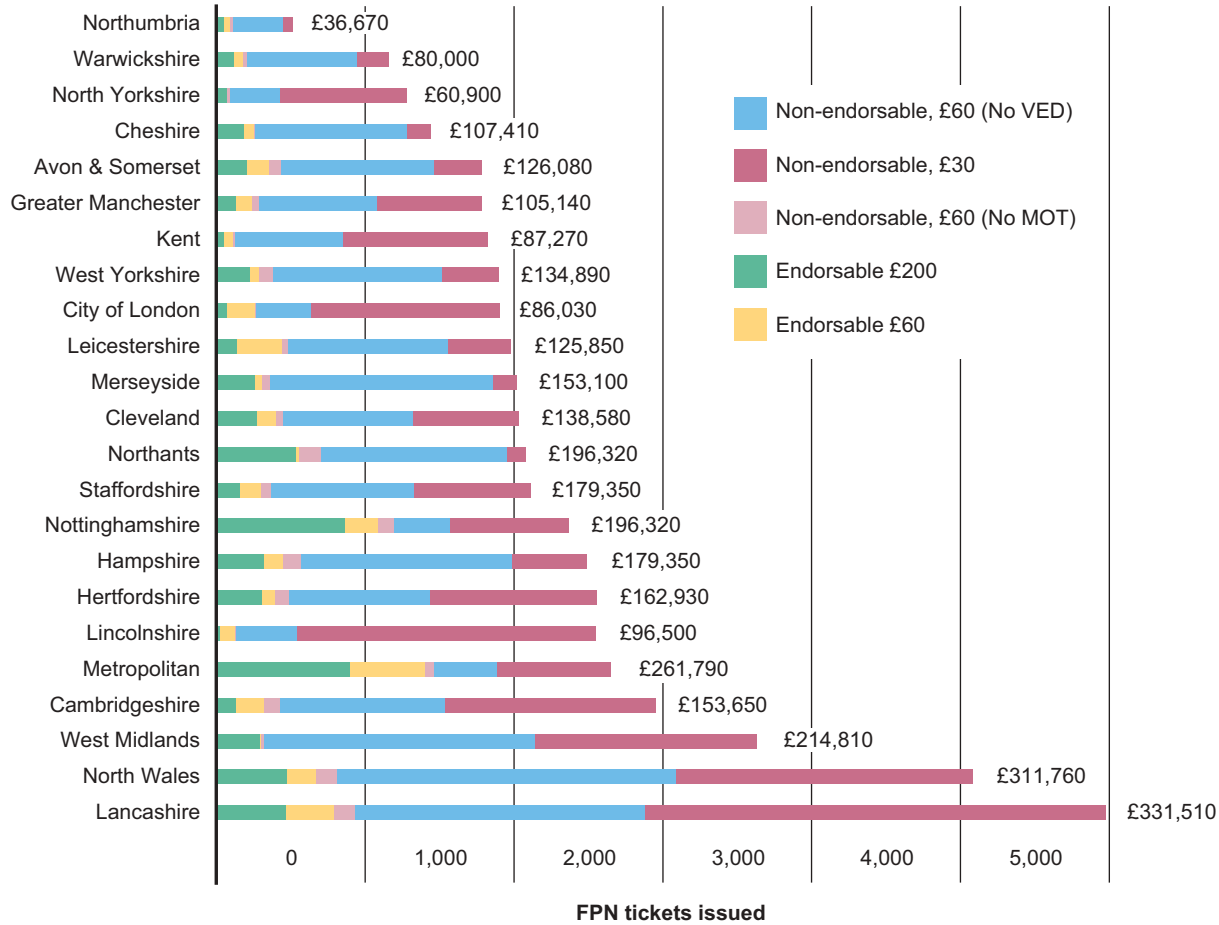
Figure 8.4: FPNs issued per 100 stops by year of vehicle registration



8.4.4 FPNs issued by force and their value

The total value of fines associated with the 54,035 FPN tickets issued by ANPR intercept teams was £3,515,320, ie an average of £65 per ticket issued. Figure 8.5 shows the breakdown of tickets issued and their value.

Figure 8.5: FPNs issued by force and their total value



On average, 12% of tickets issued were for no insurance, 6% for other endorsable offences, 3% of tickets for no MOT, 42% for no VED and 38% of tickets were £30 non endorsable tickets. As can be seen from Figure 8.5, there were significant differences in the issuing force profile of tickets issued. For example:

- 37% of the tickets issued by Nottinghamshire were for no insurance, while only 16% of their tickets were for no VED
- 70% of Cheshire's FPNs were for no VED, with only 10% of their tickets were £30 non-endorsable tickets
- 34% of the Metropolitan Police Service's tickets were for no insurance, 19% for other endorsable offences, and 16% of their tickets were for no VED.

Finding 59. On average, forces issued one FPN for every 6 officer hours on ANPR duties. There was, however, significant force by force variation in the number and profile of tickets issued, reflecting different operating conditions, priorities and working practices. For example Northumbria issued one FPN for every 24 officer hours on ANPR duties, while North Wales issued one FPN for every 2½ officer hours on ANPR duties.

8.4.5 Fine monies recovered

Laser 2 forces were only able to recover costs from those tickets issued by ANPR intercept teams that had been paid. These monies were not paid direct to the police rather they were collected by the magistrates' courts who then forwarded them on to the DCA. In the analysis below of tickets paid, it is important to understand that:

- not all tickets are paid – where this happens, the fine is registered with the magistrates' court and pursued through the courts. In these circumstances, fines monies cannot be used for cost recovery
- even where fines are paid, there is a delay between the fines being issued and the money being made available for cost recovery, specifically:
- there is a permitted payment period of (typically) 28 days between the fine being issued and the fine being lodged with the magistrates' courts
- the magistrates' courts record the payment being made and identify ANPR payments to DCA per calendar month
- each quarter the magistrates' courts forward all fine revenue (including fines associated with ANPR) to the DCA. DCA then pass on the relevant monies to the Home Office, who then assign this money on the basis of the fines paid in each Laser area.

Thus in the analysis below, only ticket revenue up to the end of March 2004 (which had been reconciled and received by the Home Office) is presented. Figure 8.6 shows the number and cash value of tickets paid (without the fine being registered) by force area as recorded by the DCA. Thus of the 42,592 tickets issues between 1 June 2003 and 31 March 2004 (approximate value £2,858,400), 20,870 tickets (42%) had been paid to magistrates' courts without the fine being registered and the money forwarded to the Home Office – amounting to £925,580, ie 32% of ticket value.

Finding 60. In general, 82% of the FPNs issued by police are paid without the fine being registered,[36] although this figure includes parking tickets. The 42% payment rate achieved for FPNs issued by ANPR intercept officers was thus low.

Unfortunately, due to the lack of connectivity between the force data systems, it was not possible to track individual tickets and their payments. Therefore no analysis on ticket payment rates by, for example, ethnicity, age of vehicle, and triggering database is possible. Seventeen forces' Central Ticket Offices (CTOs) were, however, able to provide data on total tickets paid for the 56 week period – this data was similar to that provided by DCA, though it was not reconciled.

[36] *Motoring Offences and Breath Test Statistics,* Home Office (2004)

Using this CTO data for weeks 5-56 (ie one year), 130 officer FTEs issued:

- 4,150 tickets for no insurance, with a 14% payment rate (approximately £119,600)
- 1,956 other endorsable tickets, with a 36% payment rate (approximately £41,800)
- 1,235 tickets for no MOT, with a 35% payment rate (approximately £25,600)
- 19,563 tickets for no VED, with a 32% payment rate (approximately £378,500)
- 13,269 non-endorsable £30 tickets, with a 69% payment rate (approximately £274,000).

Figure 8.6: FPNs issued by force (1 June 2003 and 31 March 2004)

	FPNs issued	FPNs paid	FPN payment rate	FPN monies paid	Average FPN revenue
Avon & Somerset	1,223	475	39%	£23,020	£48.46
Cambridgeshire	2,176	715	33%	£37,660	£52.67
Cheshire	1,285	553	43%	£34,890	£63.09
Cleveland	1,344	593	44%	£29,690	£50.07
City of London	1,628	435	27%	£24,320	£55.91
Greater Manchester	1,073	213	20%	£16,300	£76.53
Hampshire	1,915	887	46%	£55,890	£63.01
Hertfordshire	1,769	1,020	58%	£43,460	£42.61
Kent	1,665	904	54%	£35,560	£39.34
Lancashire	4,754	2,004	42%	£83,480	£41.66
Leicestershire	1,792	794	44%	£45,010	£56.69
Lincolnshire	1,780	951	53%	£33,670	£35.40
Merseyside	1,780	490	28%	£39,340	£80.29
Metropolitan	1,896	1,008	53%	£50,010	£49.61
North Wales[37]	4,386	2,375	54%	£119,950	£50.51
North Yorkshire	1,038	619	60%	£24,260	£39.19
Northamptonshire	1,731	353	20%	£29,300	£83.00
Northumbria	467	237	51%	£12,530	£52.87
Nottinghamshire	2,068	621	30%	£33,790	£54.41
Staffordshire	1,499	779	52%	£39,060	£50.14
Warwickshire	920	319	35%	£21,680	£67.96
West Midlands	2,661	981	37%	£49,430	£50.39
West Yorkshire	1,741	739	42%	£43,280	£58.57
Total	**42,592**	**18,065**	**42%**	**£925,580**	**£51.24**

[37] The DCA return for North Wales (5,180 tickets paid) has been amended to the figure recorded by North Wales Central Ticket Office (2,375) as the DCA figure is not reliable. This would mean that the average FPN revenue paid for North Wales (£23.16) is below the minimum FPN value (£30).

Finding 61. Payment rate appears to be a direct function of the fine level associated with the ticket. No insurance (which incurs a £200 fine) had a very low payment rate (14% of tickets issued) while non-endorsable £30 fines have a much higher payment rate (69%). It is interesting to note that the ticket payment for no VED was lower (32%) than general endorsable tickets (36%) – this could be because no VED will necessitate additional expenditure (taxing the vehicle) and therefore by association is a larger fine.

Finding 62. CTO figures show that there was significant force variation in payment levels. Some CTOs, for example Greater Manchester and Hampshire, were able to achieve much higher FPN payment rates than others, for example Northamptonshire and Avon and Somerset.

Finding 63. The differences in the payment rate of tickets, particularly for no insurance, are in part due to the level of fine imposed at courts. A number of forces reported an average fine level of less than £200 and less than 6 points, with a longer period to pay. A consistent approach to the fines imposed at court could have a significant impact on the payment rate of ANPR tickets.

Finding 64. On this basis, a FTE ANPR intercept officer would on average issue 310 tickets per annum (approximate value £19,900) of which £6,400 (32%) would be paid directly to magistrates' courts. Given that staff costs of a police constable are typically £35,500, including employer contributions, it is clear that ANPR cost recovery does not cover basic employment costs.

Figure 8.7: FPNs payment rates by force from CTO data (weeks 5-56)

	Endorsable £200	Endorsable £60	Non-Endorsable £60 (No MOT)	Non-Endorsable £60 (No VED)	Non-Endorsable £30
Avon & Somerset	8%	39%	22%	21%	51%
Cambridgeshire	14%	41%	31%	–	62%
Cheshire	14%	42%	36%	33%	73%
City of London	–	–	–	–	–
Cleveland	12%	45%	27%	31%	72%
Greater Manchester	31%	54%	43%	29%	83%
Hampshire	19%	41%	40%	34%	72%
Hertfordshire	9%	52%	16%	40%	79%
Kent	–	–	–	–	–
Lancashire	7%	43%	31%	29%	70%
Leicestershire	17%	22%	62%	44%	41%
Lincolnshire	–	–	–	–	–
Merseyside	26%	38%	34%	38%	69%
Metropolitan	–	–	–	–	–
North Wales	14%	–	42%	22%	75%
North Yorkshire	18%	33%	32%	40%	70%
Northamptonshire	7%	–	22%	21%	57%
Northumbria	–	–	–	–	–
Nottinghamshire	–	–	–	–	–
Staffordshire	26%	–	34%	38%	79%
Warwickshire	27%	–	43%	44%	72%
West Midlands	15%	–	29%	19%	54%
West Yorkshire	14%	19%	30%	24%	68%
Average	**14%**	**36%**	**35%**	**32%**	**69%**

Finding 65. A key point in comparing Figures 8.6 and 8.7 is that payment rates vary between CTO and DCA for some forces. For example, DCA record payment rate of FPNs issued by Greater Manchester Police as 20%, while Greater Manchester's CTO have an average payment rate of 45%. This difference is most probably due to a clerical error or delay in filling in the payments received form at the magistrates' courts (ie the magistrates' courts return to DCA) and needs to be addressed accordingly.

8.4.6 Costs incurred and fine monies recovered

As part of Laser 2, forces were able to recover their allowable costs from the fine revenues received. Prior to Laser 2 commencing, a number of issues were flagged up to forces by the Home Office:

- first, most forces already had an under-utilised ANPR potential, and therefore it was not envisaged that Laser 2 would require substantial investment in ANPR readers
- second, unlike the safety camera scheme, ANPR operations would not be accompanied by large scale communications and publicity
- thirdly, the potential scale of cost recovery was recognised to be limited and
- finally, as Laser 2 was a pilot, there was no long-term agreement to fund activity. Investment in equipment for the medium term was inappropriate.

On this basis, forces were asked to focus on recovering revenue costs associated with Laser 2, rather than other revenue costs (such as ANPR and vehicle maintenance and lease costs).

Figure 8.8: Staff costs by force and monies recovered by force (June 2003-March 2004)

Force	Staff Costs	Monies recovered [38]	Deficit
Avon & Somerset*	£530,000	£23,020	£506,980
Cambridgeshire	£343,216	£37,660	£305,556
Cheshire	£227,332	£34,890	£192,442
City of London	£258,360	£29,690	£228,670
Cleveland*	£290,000	£24,320	£265,680
Greater Manchester*	£900,000	£16,300	£883,700
Hampshire*	£560,000	£55,890	£504,110
Hertfordshire*	£240,000	£43,460	£196,540
Kent*	£760,000	£35,560	£724,440
Lancashire	£563,313	£83,480	£479,833
Leicestershire*	£540,000	£45,010	£494,990
Lincolnshire*	£680,000	£33,670	£646,330
Merseyside	£291,987	£39,340	£252,647
Metropolitan	£1,154,680	£50,010	£1,104,670
North Wales	£792,756	£119,950	£672,806
North Yorkshire	£191,450	£24,260	£167,190
Northamptonshire	£867,413	£29,300	£838,113
Northumbria*	£330,000	£12,530	£317,470
Nottinghamshire	£335,750	£33,790	£301,960
Staffordshire	£588,781	£39,060	£549,721
Warwickshire	£237,660	£21,680	£215,980
West Midlands	£832,590	£49,430	£783,160
West Yorkshire*	£420,000	£43,280	£376,720
Total	**£11,935,288**	**£925,580**	**£11,009,708**

* indicates forces where staff costs for the first financial year of ANPR were estimated from business case projections. Non estimated figures are actual costs provided by forces

The monies realised by forces relative to the costs incurred by the pilot were small. However forces recognised the value of these monies, for example:

"Had it not been for the money we recovered through hypothecation our force would not have been in the position to invest in key support areas for ANPR such as improving our databases investing in automating some of our processes."[39]

[38] Following agreement with HMT, 2% of the fines monies recovered was retained by APCO for ANPR development

[39] Tracie O'Gara, ANPR Project Manager, Lancashire Police

Finding 13. Overall the cost recovery process realised an additional £926,000 in total to the 23 Laser 2 forces over a nine-month period. While these monies did not cover the costs of the enforcement (approximately £12 million for the same period), these monies were seen to be worthwhile, for example in helping to improve the intelligence capability of the ANPR teams and providing the administrative support for the teams.

8.4.7 Wider benefits to society

In addition to addressing criminality (in part paid for by offenders), cost recovery of fixed penalty notices and the use of ANPR-enabled intercept teams also contributes to wider objectives, specifically road safety (eg through enforcing seat belt wearing and not using mobile telephones while driving) and excise collection (eg ensuring that all vehicles on the road are appropriately taxed).

Findings: ANPR arrest outcomes

This section of the evaluation provides an analysis of the arrest outcomes (that is to say, what proportion of the arrests led to successful convictions). In particular it highlights: [Section 9.2]

- an average ANPR FTE will contribute around 31 offences per annum towards to the Offences Brought to Justice Target – this is over three time more than general policing
- if ANPR intercept teams were rolled out one per BCU, this would contribute 26,400 additional OBTJs per annum towards the target – a contribution of around 15% to the Government's target
- since Laser involves redeploying existing resources more effectively, this represents little incremental cost and hence good value for money.

9.1 Context

Narrowing the Justice Gap (NJG) – the difference between the number of crimes that are recorded and the number that result in the perpetrator being brought to justice – is a key measure of the effectiveness of the criminal justice system (CJS) and an important way in which public confidence in the CJS can be improved. The police play a critical role in NJG through the detection of crime and, in partnership with the Crown Prosecution Service, the successful prosecution of offenders.

The CJS has been set a target to increase the number of offences brought to justice from 1.02 million offences in 2000-2001 to 1.2 million by 2005-06.[40] Work on NJG is being led by the Justice Gap Taskforce comprised of senior members from each of the CJS agencies.

9.2 Tracking the outcome of ANPR arrests

ANPR was identified by the Justice Gap Taskforce as having the potential to make an important contribution to the delivery of the NJG target. In order to assess the scale of that contribution, forces were asked to collect outcome data for ANPR arrests. The Justice Gap Action Team also asked the evaluation team to model the potential impact of rolling out Laser 2 nationally on the NJG target. The findings of this work, together with an assessment of the impact of ANPR on NJG objectives relative to other initiatives, are discussed in this section.

At this point it is also worth noting the counting rules used to measure the number of Offences Brought To Justice (OBTJs). OBTJs consist only of recorded or notifiable offences. These cover all 'Indictable Only' (the most serious offences which must be prosecuted through the Crown Court) and 'Either Way' (serious offences which must be prosecuted through the Crown Court) offences and a small number of 'Summary' offences. A full list of these is included in Appendix G. It is also important to note that recorded offences exclude a number of the misdemeanours/crimes dealt with by ANPR, such as driving while disqualified and driving under the influence of alcohol/drugs.

Laser 2 forces were therefore asked to use the custody reference numbers collected as part of the roadside pro forma to identify the outcome of the arrests made. Not all forces were able to undertake this tracking process – different IT systems adopted by police forces, courts and other agencies made case tracking a considerable challenge for the majority of Laser forces. In total, 11 forces provided outcome information in the required format for this NJG study. These forces, listed below, represented a cross-section of force size and geography and could therefore be considered a reasonably representative sample for modelling purposes.

[40] *Narrowing the Justice Gap Framework,* Home Office (October 2002)

Cleveland	Kent	North Yorkshire	Greater Manchester
Hampshire	Lancashire	West Midlands	North Wales
Hertfordshire	Lincolnshire	Cheshire	

To give the maximum opportunity for all cases to have progressed through the system and reached some form of disposal (that is where an offence is considered dealt with and where it exits the prosecution system), the modelling exercise considered only those arrests made during the first three months of Laser 2 (ie between June and August 2003). No comparable data was routinely collected as part of Laser 1 and therefore arrests made prior to the start of Laser 2 were not considered.

The data collected for the tracking of ANPR outcomes was based on the premise that arrests could be disposed of at a number of points, either by police or by the courts. While it was not possible to track the outcomes of arrests that were handed over to other agencies (eg immigration and other police forces), nor arrests for outstanding warrants, those forces providing data were able to identify the outcome of cautions as well as the results of court proceedings for recorded offences.

The findings for the ANPR arrest tracking aspect for recorded offences were as follows:

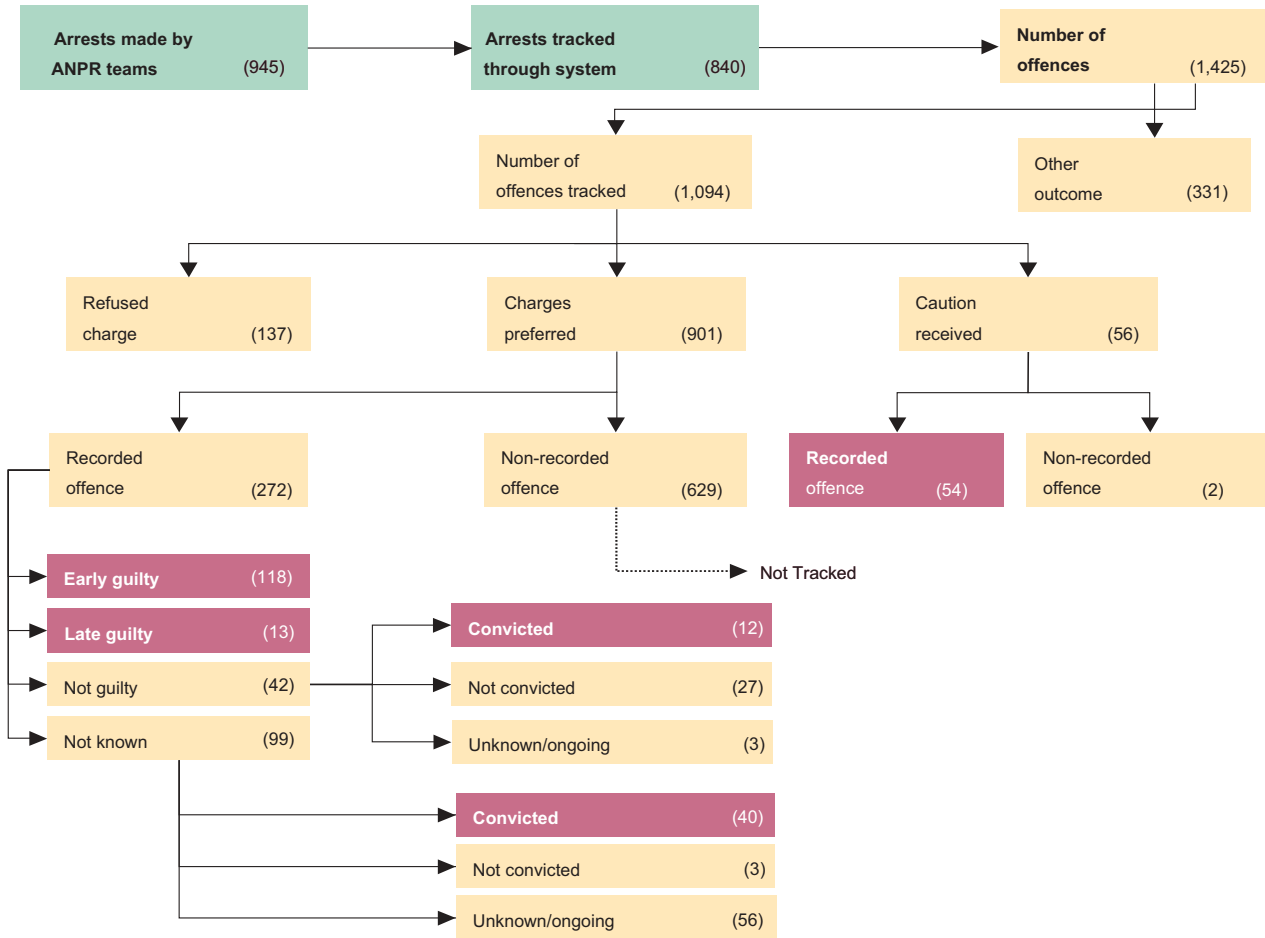
- The forces taking part in the study tracked 840 arrests. This represented 89% of all arrests that were captured by ANPR intercept deployments in the 11 areas. The remaining 11% could not be tracked through the system, either due to discrepancy between the Custody Reference Number recorded on the pro forma with the force's tracking database or where the Custody Reference Number was missing. These 840 arrests were delivered by 46 FTE.
- The 840 arrests that could be tracked related to 1,425 offences. Of these, 1,094 (77%) were dealt with by the arresting police force (ie not transferred to other forces or agencies) and related to 'new' offences. The balance of the 331 arrests were warrant arrests (116) or the offence was dealt with by a force/agency other than by the arresting force (215). Because of the difficulty in tracking across agency, the modelling exercise was based on only these 1,094 offences tracked.
- Of the 1,094 offences tracked, charges were refused on 137 occasions, ie the police took no further action at that time and the specific charges dropped. A further 56 (5%) were dealt with by caution. Of these, 54 were defined as recorded offences according to Home Office guidelines (Appendix G) and therefore contributed to OBTJ.

- Thus, of the 1,094 offences that were tracked, charges were preferred (someone was charged) for 901 offences (ie 1,094-137-56). This equates to 82% of offences resulting in charge. Of these 901 charges, 272 were for recorded offences (30%). These 272 recorded offences resulted in the following pleas:
  - 43% (118 offences) led to an early guilty plea, that is where the defendant admitted guilt at the first opportunity
  - 5% (13 offences) led to a late guilty plea, that is where the defendant previously pleaded not guilty but changed this to a guilty plea prior to trial
  - 15% (42 offences) led to a not guilty plea, that is where the defendant pleaded not guilty and trial proceedings began
  - 36% (99 offences) for which no plea data was available.

  Therefore 131 (118+13) recorded offences (48%), where charges were made, were successfully disposed without trial proceedings beginning (though this could be higher due to the 99 offences where no plea data was available).
- Of the 42 offences where there was a not guilty plea:
  - 12 offences (29%) resulted in successful convictions
  - 27 offences (64%) were acquitted
  - for 3 offences (7%) the result was either on-going or no information was provided.
- Of the 99 offences where there was no plea data available:
  - 40 offences (40%) resulted in successful convictions
  - 3 offences (3%) were acquitted
  - for 56 offences (56%) the result was either on-going or no information was provided.
- In terms of outcomes:
  - there were successful outcomes for 237 recorded offences (54 cautions, 188 early guilty pleas, 13 late guilty pleas and 52 convictions, though not all of these have gone to court for trial), ie 73% of recorded offences had successful outcomes
  - for a further 59 recorded offences (3 not guilty pleas and 56 no plea information available), there either the case was still on-going and there was no case disposal data, ie for 18% of recorded offences there was no case disposal data
  - in only 30 recorded offences (27 not guilty pleas resulting in no conviction and 3 cases where there was no plea information available), there was no conviction, ie 9% of recorded offences resulted in no conviction.

The disposal of offences is summarised in Figure 9.1 below.

Figure 9.1: How offences from a sample of 945 ANPR arrests were brought to justice



From the above analysis, the key findings are:

• in terms of new OBTJ contribution:

– The review period related to 13 weeks (one quarter year) of data collection and involved 46 FTE officers. These officers made 840 arrests that contributed 237 OBTJs. This equates to roughly to 21 OBTJs per ANPR FTE (237 x 4 quarters / 46 FTE officers)

– In addition, 59 of the 272 recorded offences (22%) for which charges were pressed were still pending an outcome or no outcome had been recorded. Assuming that the profile of outcomes remains consistent, there would be approximately 30 more offences brought to justice. Over a year this would add a further 2-3 OBTJs per FTE per annum (24)

– Further, for 11% of the arrests made there was no case tracking information (including outcome). If half of these arrests follow a similar profile (the other 50% assumed to be arrests that lead to nothing and hence unreported) then that would mean that ANPR intercept teams would deliver 25 OBTJs per FTE.

Given that the use of ANPR intercept teams is a relatively new approach and that the data tracking exercise is related to the early stage of Laser 2, it would not be unreasonable to expect an increase in performance over time. For example, for those forces providing case tracking information, the arrest rate in the first quarter of Laser 2 was 83 arrests per FTE. For the final quarter this had risen to 117 arrests per FTE (+41%), while for all forces the equivalent increase was +23%. It would not be unreasonable, therefore, to argue that when operating in a steady state, ANPR intercept teams would deliver 31 OBTJs per FTE.

Finding 67. As a conservative estimate, an average ANPR FTE will be able to contribute 31 offences towards the OBTJ target. This compares favourably against the 9 OBTJs that general policing duties would deliver.

- ANPR will also have an impact on disposal of existing recorded cases; specifically during Laser 2, there were 1,813 arrests relating to outstanding warrants. It is not possible to estimate what proportion of these warrants related to recorded offences, however it is likely that a significant proportion relate to offences where charges had been preferred. While some warrants may relate to failure to produce documentation at the police station (HO/RT/1 offences), it is probable that this is indicative of other offences. Further, close working with courts in using the outstanding warrant database by ANPR intercept teams will ensure that warrants are executed more quickly and will help to maintain the integrity of the warrant process.
- The modelling exercise suggested that a further 215 (of the 1,425) offences detected by ANPR intercept teams were passed over to other forces/agencies. These will make a contribution to OBTJ, however there is no data on which to base an estimate.
- The contribution of ANPR could improve further if offences such as driving while disqualified were included in NJG figures. In the sample of 840 arrests, there were 159 offences of driving while disqualified (118 of which have already led to convictions) and 4 drink-driving offences all of which have already been successfully convicted. If the above offences were to become part of the NJG group, 15 additional offences would be brought to justice per officer per annum.

If it is assumed that each ANPR intercept officer generates 31 OBTJs per year:

- When Project Laser is rolled out nationally, it is envisaged that approximately 1,200 uniformed FTE officers will be operating as part of ANPR intercept teams (on average one intercept team per BCU). These officers will be transferred from existing policing duties, rather than be additional staff.
- Prior to operating as ANPR intercept officers, these officers would on average have delivered 9 OBTJs each per annum.

Finding 68. On the basis of the analysis presented, the national roll-out of ANPR will deliver 37,200 OBTJs per annum (1,200 x 31). Because the roll-out of the ANPR intercept teams would be resourced by existing officers, not all of these OBTJs will be new offences, ie the officers will have made arrests for recorded offences in their normal duties. On this basis, the roll-out of the ANPR intercept teams will deliver an additional 26,400 OBTJ per annum, ie approximately 15% of the target of additional offences brought to justice.

Finding 69. Project Laser is one of 13 initiatives assessed by JGAT as contributing to the NJG target. On the basis of the above findings, the national roll-out of Laser 2 makes a major contribution to the achievement of the OBJT target, ie it is one of the more significant projects in terms of OBTJ (approximately 15% of the additional offences required to meet the OBTJ target). It is also worth noting that the roll-out of Project Laser nationally would see existing resources (officers) deployed more effectively, rather than the use of additional resources (and hence increased cost).

Conclusions and recommendations

This section of the evaluation provides overall conclusions and recommendations that can be drawn from the evaluation of Laser 2.

10.1 Conclusions

On the basis of Laser 2 evaluation findings, the following conclusions have been made:

10.1.1 Context

C1. The use of ANPR-enabled intercept teams to engage criminality on the road is clearly aligned with a number of key Government objectives, including the recently published strategic plan for criminal justice, the police service's National Intelligence Model and ACPO's Road Policing strategy. The use of ANPR-enabled intercept teams also contributes to wider objectives, specifically road safety (eg through enforcing seat belt wearing and not using mobile telephones while driving) and excise collection (eg ensuring that all vehicles on the road are appropriately taxed).

C2. The concept of ANPR-enabled intercept teams also addresses the public's desire to see more 'officers on the street' and more action taken against illegal drivers. Given the link between vehicle documentation offences (which can be relatively easily identified from national databases) and wider criminality, we conclude the targeting of these offences through the use is of ANPR-enabled intercept teams can make significant contributions to policy objectives.

C3. While ACPO have an ANPR strategy, at present there is no overarching Government strategy for ANPR – this would cover issues around what investment is made in ANPR equipment, what standards apply to this equipment cross-Government, where and when the equipment is deployed, the use of databases with ANPR systems, data sharing from the cameras and communications strategy. The lack of a coordinated strategy across Government means that the full benefits of ANPR are not being realised, especially between the Home Office and the Department for Transport.

10.1.2 Technology

C4. Both Laser 1 and Laser 2 evaluations have shown ANPR to be an effective policing tool for reading large volumes of VRMs that can be deployed in a number of ways (in-car systems, mobile units or via CCTV systems) to suit operational requirements. When set up properly, the technology has proven reliable and accurate – typically more than 95% of VRMs are correctly read. Given the volume of traffic on the roads, without ANPR, police could not enforce vehicle documentation offences effectively without this capability.

C5. To improve the effectiveness of teams, forces often visually verified VRM reads of hits before a vehicle was stopped or stopped vehicles on the basis of officer judgement. This was an important aspect to the success of ANPR-enabled intercept teams. Not only did this recognise the benefits of experienced officers it also allowed for a visual check of vehicles (for a VED tax disc) before they were stopped, and prevented an over-reliance on technology. This type of good practice should be encouraged.

10.1.3 Deployment

C6. The expansion of Laser 1 to Laser 2 has shown that the results achieved within a small-scale pilot can be achieved across a much wider cross-section of forces and these results are sustainable over time.

C7. There was no evidence from Laser 2 as to the optimum number of officers per team or ANPR-enabled intercept teams/officers per force area. However given the small proportion of ANPR hits that were stopped (less than 10%) and the fact that intelligence flags are likely to increase (with the introduction of the MOT and the no insurance databases), the current staffing of intercept teams could be increased considerably across forces without the introduction of significant dead time.

C8. In terms of national roll-out, there was no information from Laser 2 to suggest that the staffing front-line intercept activities with 2,000 officers would produce significantly different results from those achieved during Laser 2, providing an appropriate performance management regime is in place.

C9. ANPR has been shown to be three times more effective at bringing offences to justice compared to conventional policing.

C10. While the focus of the Laser 2 intercept teams was engaging criminality, they will also have had an impact on road safety matters (for example through stopping over 20,000 vehicles where the driver was using a mobile telephone or not wearing a seat belt) and tax evasion (through stopping 22,000 vehicle drivers whose vehicles were not taxed).

10.1.4 ANPR team management

C11. Areas that performed the best had a combination of strong leadership within the police, supported by teams of highly motivated officers (with complimentary skills). The quality of local intelligence is key to the success and relies as much on good back office support and analysis as it does on the front-line intercept teams.

10.1.5 Intelligence and data quality

C12. Both Laser 1 and Laser 2 evaluations highlighted existing inadequacies in the accuracy of various intelligence databases, in particular DVLA's 'no VED' and 'no current keeper'. Data used with ANPR must be as accurate and up-to-date as possible for a number of reasons. First, poor quality data leads to inefficient targeting of police resources. Second, inefficient targeting means that law-abiding members of the public are being unnecessarily stopped.

C13. While DVLA has undertaken a number of measures to improve data accuracy, for example the introduction of bar-coded V11 forms and barcode readers in Post Offices and the introduction of continuous registration, these have not resulted in an improvement in data accuracy (as reported for ANPR operations). As yet, there are no CJX facilities for the electronic transfer of updated information to forces on a daily basis and this is a further limitation on database accuracy. Further, there is a lack of rigorous understanding as to the precise causes of data inaccuracies. As data is key to ANPR, we conclude that this represents a weakness that should be addressed.

10.1.6 Resources and cost recovery

C14. The controls and processes set in place by the ANPR Steering Group have worked well – while forces were required to collect additional information and were able to issue new fixed penalties, there was no evidence to suggest that operational priorities were distorted – forces achieved similar arrest rates and performance levels to Laser 1.

C15. Given the focus on recovering monies from FPNs, the Laser 2 evaluation highlighted the low payment levels associated with some fines. In particular the introduction of a £200 fine and 6 penalty points for no insurance was supposed to reduce the burden on police and courts. However with a 14% payment rate this is not the case. The failure of the FPNs to reduce the bureaucratic burden represents a weakness that should be addressed.

C16. Overall the cost recovery process realised an additional £1 million in total to the 23 Laser 2 forces over a nine-month period. While these monies did not cover the costs of the enforcement (approximately £12 million for the same period), these monies were seen to be worthwhile, for example in helping to improve the intelligence capability of the ANPR teams and providing the administrative support for the teams. On this basis, we conclude that the cost recovery aspect contributed to the overall success of Laser 2.

C17. Forces did not receive any additional funding for Laser 2 other than the monies available via cost recovery.

In terms of operation, the use of ANPR intercept teams represents an innovative approach:

- Targeting vehicle documentation enforcement to engage with and disrupt criminals
- Delivered through an intelligence-led piece of technology (an ANPR reader)
- Benefiting from officers' experience (eg observations of vehicle drivers)
- Supported by existing policing processes (eg prisoner handling).

On this basis we conclude that ANPR-enabled intercept teams have shown to be an extremely effective means of engaging criminals. Laser 2 has built upon the significant success of Laser 1 by proving the concept across a wider range of forces, over a longer time period and with a greater level of resource. Using a range of police intelligence and experience, Laser 2 intercept teams were able to disrupt criminal activity in an efficient and effective manner, bringing more than three times the number of offences to justice that comparable resources deployed through conventional policing would achieve.

While the cost recovery element realised less than 10% of the expenditure incurred, these monies were key for example in helping to improve the intelligence capability of the ANPR teams and providing the administrative support for the teams. Therefore, we conclude that the cost recovery aspect contributed to the overall success of Laser 2. The pilot identified a number of areas where operations could be improved (in particular data). Once these have been addressed and given the development of a good practice manual, it would be expected that ANPR would be an even more effective policing tool than was shown in the pilot.

The Laser 2 evaluation identified a number of both positive and negative lessons learnt from the pilot, including:

- **Effective project management** – Project Laser has introduced additional workloads on police, involved large number of parties and required delivery across traditional organisational boundaries. Potentially the project was risky. However, given that it has developed the ANPR intercept concept and helped 23 forces to deliver and prove the concept this can be taken as an indication as to the successful management of the project. Contributing factors to this include:
  - sponsorship from senior levels, in particular an ACPO "champion"
  - clear terms of reference and objectives that have provided a focus for the project. While associated issues have been raised the project (data quality) has not sought to address all matters

  - effective risk management, including recognition that taking risks and developing new ways of working is a key aspect to pilots
  - central support, including from both PSU and ACPO
- **Demonstrating effectiveness** – a key aspect to the project has been that it has sought at all stages to demonstrate effectiveness and contribution to Government and police targets. This has required significant and often onerous data collection by forces, however this has lead to a significant data and knowledge:
  - to support performance management within forces
  - that provides the basis for independent evaluation and demonstration that Project Laser is effective
  - supports the intelligence-led project.
- **Data validation** – in addition to the data collection in the field, there was a process of data entry and subsequent validation. Given that much of the data collected relates to each other (for example deployment data relates to stops), then the data validation process could have been built in to the data entry process. This would have reduced both the burden of data entry/validation and improved the quality of data. The Home Office have recognised this and are in the process of developing a bespoke data entry tool for forces.
- **Change management** – Laser 2, has by its very nature necessitated considerable change for those taking part, including a new way of working, additional fixed penalties, new requirements on intelligence. Many of these changes happened within a very short timescale and in some circumstances, in particular where there are interdependencies with other projects and the very complexities of trying to manage change across 23 forces.
- **The importance of legislation** – key aspects of Project Laser (in particular the on-going roll-out and improving effectiveness) are dependent on setting in place enabling legislation. Given the pressures on the legislative timetable, it has been crucial to have in place the necessary political support to carry forward the amendments.
- **Laser 2 is not a road policing project** – while Laser 2 is being led from the road policing portfolio within ACPO it is not a roads policing project. A key issue for the project has been to engage those outside the road policing community to convince them of the value of Laser. This has included active engagement with ACPO crime representatives, communications to forces and promotion of the concept by PSU. While this has been in part successful, the knowledge of the capability of ANPR across forces appears to be patchy.

10.2 Recommendations

On the basis of the evaluation findings and conclusions, the following recommendations are made:

10.2.1 Roll-out of Project Laser

R1. Project Laser has proved that ANPR intercept teams, if used appropriately, can be an extremely effective police tool in engaging and dealing with criminality in all its forms. There is a strong case that Laser is rolled out nationally and this roll-out proceeds as rapidly as possible to ensure that the benefits to police and society are achieved.

Rapid roll-out, however, creates a short-term funding problem. The introduction of cost recovery to recycle the money requires primary legislation. From the evidence gathered to date in the first 13 months of Laser 2, this is never going to be sufficient to fund the rapid roll-out of Laser, including centralised support and the possible development of a centralised intelligence function. This leaves two options: funded centrally or through local reprioritisation. We recommend a combination of the two provides a way forward in the short-term with some funding being ring-fenced centrally, perhaps for capital and infrastructure costs, and this being matched by police forces to staff the units. A business case for this investment is required.

Cost recovery could then be used as a means of supplementing local force expenditure, in particular in the improvement of intelligence and its handling. Within the context of HMT cost recovery rules, this use of monies seems appropriate for two reasons. First it avoids any question of double funding. Second it will lead to an improvement in ANPR team effectiveness and achievement of policy objectives.

R2. Whichever funding route is found, it is important that Laser is extended nationally as part of a co-ordinated programme, managed centrally. This will allow for the spread of best practice, the development and use of appropriate standards (eg data), co-ordination in response to issues (eg external communications and data quality issues). Whilst it is desirable to have the ability to recover some of the costs, this should not constrain roll-out of the programme. One of the key successes of the programme to date has been the central coordination of the programme by the Police Standards Unit. The participation of 23 police forces has added to the complexity of the data collection and analysis and considerable effort has been invested in standardising the data collection and analysis procedures. If the programme is to be rolled out nationally with cost recovery as an element, it seems sensible that that the central coordination is retained within the Home Office.

10.2.2 Review of data used for ANPR

R3. The introduction of MOT and no insurance databases, planned for later in the year, is an important development and should increase the productivity of the ANPR intercept teams. These should be fully evaluated in terms of their strengths and weakness for use with ANPR teams before their introduction.

R4. The accuracy of the DVLA database in particular needs to be investigated. There are also substantial variations in the quality and accuracy of local intelligence databases that require investigation. There should be more effective use of intelligence at a national and at a local level.

10.2.3 Deployment management

R5. Currently, most ANPR teams are tasked and deployed from a central location. This can mean in some areas that considerable time is spent travelling to and from ANPR intercept sites. Clearly, this is not best use of police time and we suggest that consideration is given to co-locating ANPR intercept teams with BCUs and roads policing units, as appropriate. Support systems will need to be put in place to ensure best practice and intelligence is shared and performance monitored as a whole.

10.2.4 Review of level of fines and payment rates

R6. There is an apparent disconnect between the levels of fixed penalties for the more serious offences and the penalties that are awarded if the case is taken to court – anecdotal evidence suggest that penalties in some cases are less in court, both in monetary value and the number of points awarded. This could potentially damage the effectiveness of the fixed penalty scheme and needs to be urgently reviewed by ACPO and the DCA.

10.2.5 National vehicle intelligence data warehouse

R7. There is an urgent need to move from a heavy reliance on locally produced and held vehicle intelligence to the provision of a national vehicle intelligence data warehouse, which would hold all relevant vehicle intelligence and be accessed in real time by ANPR readers. This data warehouse should also hold ANPR reads and hits, which are themselves a vital source of vehicle intelligence and should be accompanied by the development of data mining tools of a more sophisticated nature. This vehicle intelligence database must be part of, or compatible with, the National Intelligence Management system proposed under Bichard.

10.2.6 Development of a national ANPR strategy

R8. Many Government departments and agencies (principally within the remit of the Home Office and the Department for Transport) have invested heavily in ANPR technology. There has been little coordination of this activity. In some cases, this has lead to duplication of effort and wasted resources. Now is a good time to take stock, to plan for future investment and make sure that there is best use from existing infrastructure. We recommend that the Home Office and Department for Transport, working with other Government departments and key stakeholders, develop a detailed strategy and implementation plan for ANPR for the next few years. This would address a number of issues including:

- the setting of standards and protocols for information sharing across Government
- investments in ANPR infrastructure (both cameras, communications and back-office) to maximise value for money for Government
- a protocol for dealing with ANPR databases such errors in the data only need to be address by one body, that multiple agencies do not end up pursuing the same motorists
- a communication strategy for Government on ANPR cameras, what they are used for and how to deal with press/public enquiries
- consideration of how to link to future programmes such as lorry road user charging, road user charging, electronic vehicle identification, the national ID card programme and biometrics would link in
- how the lessons learnt from the ANPR programme could be exploited in other similar programmes.


VIDEO
EQUIPPED

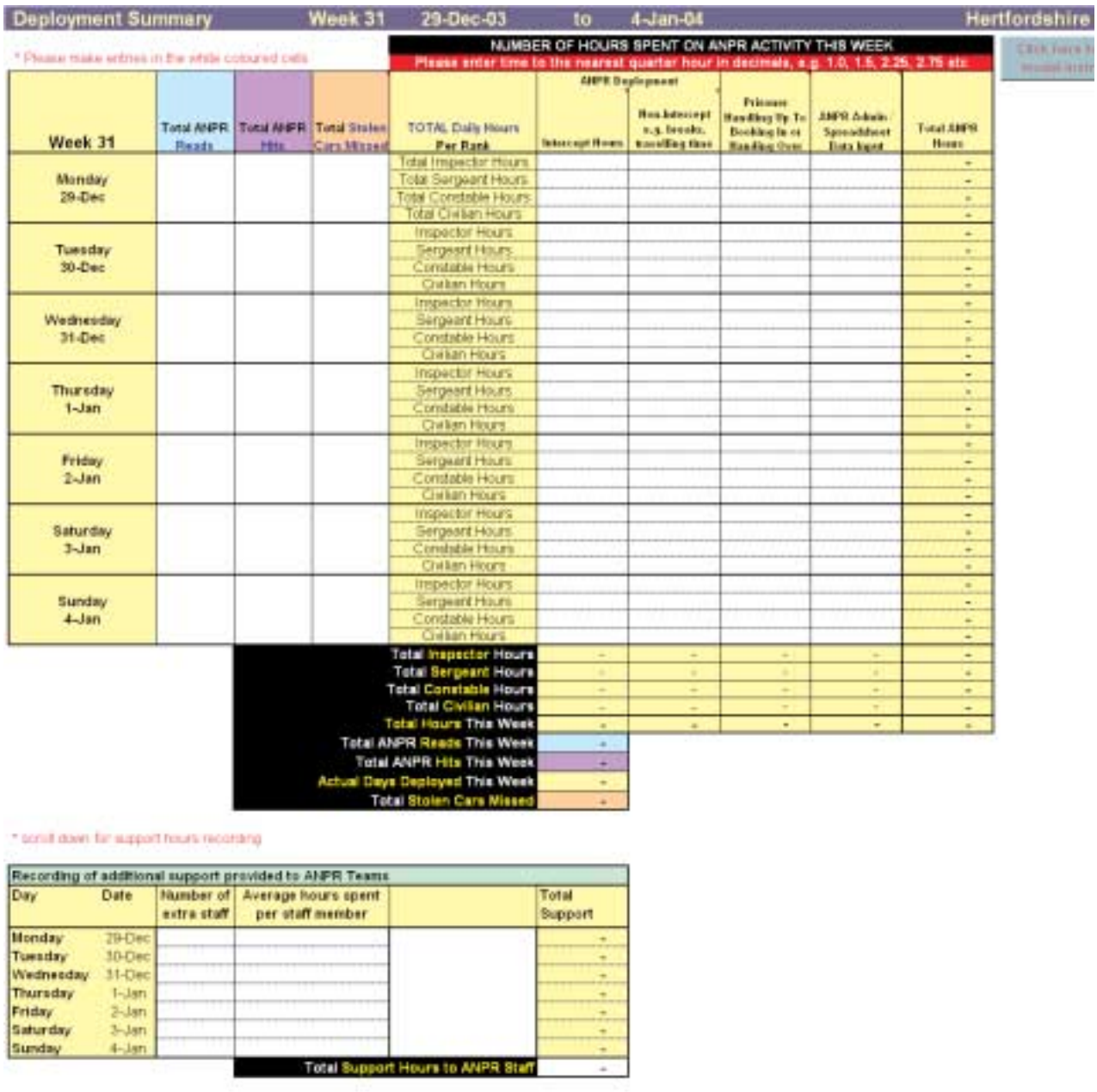
Appendix

Appendix A: Acronyms

ABI	Association of British Insurers
ACPO	Association of Chief Police Officers
ACPOS	Association of Chief Police Officers in Scotland
ANPR	Automatic Number Plate Recognition
BCU	Basic Command Unit
CCTV	Closed Circuit Television
CJS	Criminal Justice System
CJX	Criminal Justice Extranet
CTO	Central Ticket Offices
DfT	Department for Transport
DCA	Department for Constitutional Affairs
DVLA	Driver and Vehicle Licensing Agency
EVI	Electronic Vehicle Identification
FIS	Force Intelligence System
FLINTS	Force Linked Intelligence System
FTE	Full Time Equivalents
FPN	Fixed Penalty Notice
HMIC	Her Majesty's Inspectorate of Constabulary
HMT	Her Majesty's Treasury
HO/RT/1	Home Office Road Transport form 1 (document producer)
MOT	Ministry of Transport
NCIS	National Criminal Intelligence Service
NIM	National Intelligence Model
OBTJ	Offences Brought To Justice
OCU	Operational Command Units
NJG	Narrowing the Justice Gap
PA	PA Consulting Group
PITO	Police Information Technology Organisation
PNC	Police National Computer
PSU	Home Office Police Standards Unit
RTA	Road Traffic Act
SORN	Statutory Off Road Notification
VED	Vehicle Excise Duty
VERA	Vehicle Excise and Registration Act
VOSA	Vehicle and Operator Services Agency
VRM	Vehicle Registration Mark

Appendix B: Data collection pro forma

Figure B.1: Deployment Pro Forma



Deployment Summary Week 31 29-Dec-03 to 4-Jan-04 Hertfordshire

* Please make entries in the white coloured cells

NUMBER OF HOURS SPENT ON ANPR ACTIVITY THIS WEEK

Please enter time to the nearest quarter hour in decimals, e.g. 1.0, 1.5, 2.25, 2.75 etc.

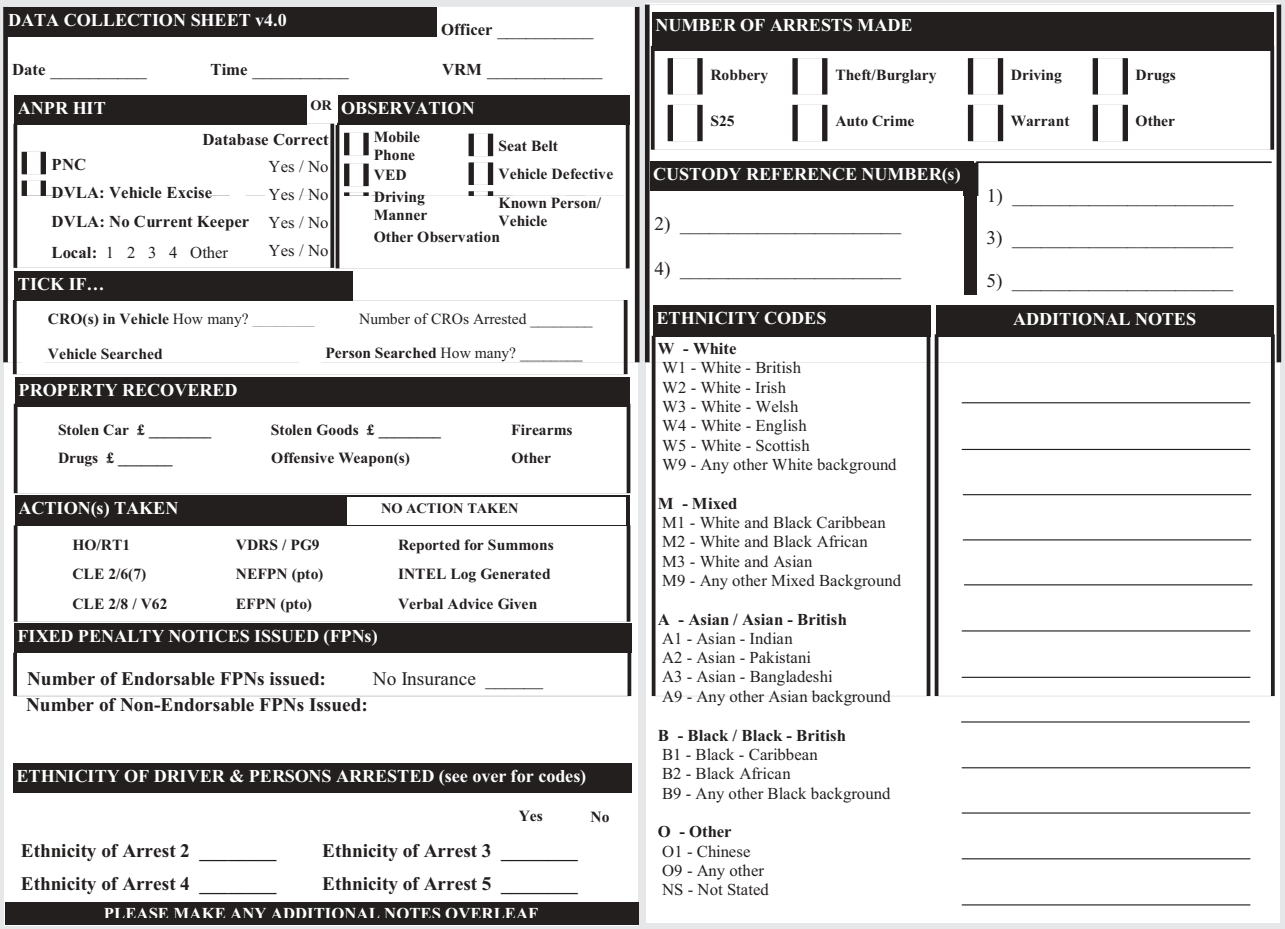
Week 31	Total ANPR Reads	Total ANPR Hits	Total Stolen Cars Missed	TOTAL Daily Hours Per Rank	ANPR Deployment: Intercept Hours	ANPR Deployment: Non-Intercept e.g. breaks, travelling time	Prisoner Handling: Up To Booking In or Handing Over	ANPR Admin / Spreadsheet Data Input	Total ANPR Hours
Monday 29-Dec				Total Inspector Hours					-
				Total Sergeant Hours					-
				Total Constable Hours					-
				Total Civilian Hours					-
Tuesday 30-Dec				Inspector Hours					-
				Sergeant Hours					-
				Constable Hours					-
				Civilian Hours					-
Wednesday 31-Dec				Inspector Hours					-
				Sergeant Hours					-
				Constable Hours					-
				Civilian Hours					-
Thursday 1-Jan				Inspector Hours					-
				Sergeant Hours					-
				Constable Hours					-
				Civilian Hours					-
Friday 2-Jan				Inspector Hours					-
				Sergeant Hours					-
				Constable Hours					-
				Civilian Hours					-
Saturday 3-Jan				Inspector Hours					-
				Sergeant Hours					-
				Constable Hours					-
				Civilian Hours					-
Sunday 4-Jan				Inspector Hours					-
				Sergeant Hours					-
				Constable Hours					-
				Civilian Hours					-
				Total Inspector Hours	-	-	-	-	-
				Total Sergeant Hours	-	-	-	-	-
				Total Constable Hours	-	-	-	-	-
				Total Civilian Hours	-	-	-	-	-
				Total Hours This Week	-	-	-	-	-
				Total ANPR Reads This Week	-				
				Total ANPR Hits This Week	-				
				Actual Days Deployed This Week	-				
				Total Stolen Cars Missed	-				

* scroll down for support hours recording

Recording of additional support provided to ANPR Teams

Day	Date	Number of extra staff	Average hours spent per staff member		Total Support
Monday	29-Dec				-
Tuesday	30-Dec				-
Wednesday	31-Dec				-
Thursday	1-Jan				-
Friday	2-Jan				-
Saturday	3-Jan				-
Sunday	4-Jan				-
			Total Support Hours to ANPR Staff		-

Figure B.2: Roadside Stop pro forma



DATA COLLECTION SHEET v4.0

Officer _____

Date _____ Time _____ VRM _____

ANPR HIT OR OBSERVATION

Database Correct			
PNC	Yes / No	Mobile Phone	Seat Belt
DVLA: Vehicle Excise	Yes / No	VED	Vehicle Defective
DVLA: No Current Keeper	Yes / No	Driving Manner	Known Person/ Vehicle
Local: 1 2 3 4 Other	Yes / No	Other Observation	

TICK IF…

CRO(s) in Vehicle How many? _____ Number of CROs Arrested _____

Vehicle Searched Person Searched How many? _____

PROPERTY RECOVERED

Stolen Car £ _____ Stolen Goods £ _____ Firearms

Drugs £ _____ Offensive Weapon(s) Other

ACTION(s) TAKEN NO ACTION TAKEN

HO/RT1	VDRS / PG9	Reported for Summons
CLE 2/6(7)	NEFPN (pto)	INTEL Log Generated
CLE 2/8 / V62	EFPN (pto)	Verbal Advice Given

FIXED PENALTY NOTICES ISSUED (FPNs)

Number of Endorsable FPNs issued: No Insurance _____

Number of Non-Endorsable FPNs Issued:

ETHNICITY OF DRIVER & PERSONS ARRESTED (see over for codes)

Yes No

Ethnicity of Arrest 2 _____ Ethnicity of Arrest 3 _____

Ethnicity of Arrest 4 _____ Ethnicity of Arrest 5 _____

PLEASE MAKE ANY ADDITIONAL NOTES OVERLEAF

NUMBER OF ARRESTS MADE

Robbery	Theft/Burglary	Driving	Drugs
S25	Auto Crime	Warrant	Other

CUSTODY REFERENCE NUMBER(s)

1) _____ 2) _____ 3) _____ 4) _____ 5) _____

ETHNICITY CODES

W - White
W1 - White - British
W2 - White - Irish
W3 - White - Welsh
W4 - White - English
W5 - White - Scottish
W9 - Any other White background

M - Mixed
M1 - White and Black Caribbean
M2 - White and Black African
M3 - White and Asian
M9 - Any other Mixed Background

A - Asian / Asian - British
A1 - Asian - Indian
A2 - Asian - Pakistani
A3 - Asian - Bangladeshi
A9 - Any other Asian background

B - Black / Black - British
B1 - Black - Caribbean
B2 - Black African
B9 - Any other Black background

O - Other
O1 - Chinese
O9 - Any other
NS - Not Stated

ADDITIONAL NOTES

Figure B.3: Case Study pro forma

Please detail cases where an ANPR hit resulted in a significant outcome. Please include why the vehicle was stopped, how ANPR influenced the stop, what happened at the roadside, what the reason for the arrest was and what the outcome was. Please do not enter any confidential details as some of these case studies may later be published.

ANPR CASE STUDY 1

Police Force: Avon & Somerset Police

Date: _____ Time _____

Trigger: _____

Please enter case study details here.

ANPR CASE STUDY 2

Police Force: Avon & Somerset Police

Date: _____ Time _____

Trigger: _____

Please enter case study details here.

ANPR CASE STUDY 3

Police Force: Avon & Somerset Police

Date: _____ Time _____

Trigger: _____

Please enter case study details here.

ANPR CASE STUDY 4

Police Force: Avon & Somerset Police

Date: _____ Time _____

Trigger: _____

Please enter case study details here.

Appendix C: Data completeness by field

While every effort was made to ensure that data quality remained high and all data items were returned complete, there were instances where inconsistencies in the data meant that they could not be considered in the analysis or where returns were incomplete. These included stops where there were internal inconsistencies within the information provided. Examples of this included occasions where the reasons for stops were unrecorded and arrests were recorded and either not categorised or no other information was captured about the stop. The table below breaks down the number of such excluded stops for every force where the data were considered unreliable

Figure C.1: Unreliable stops by force

Force Name	Stops record omitted	% of evaluated stops
Avon and Somerset	9	0.12%
Cambridgeshire	41	0.44%
Cheshire	21	0.41%
City of London	22	0.86%
Cleveland	67	1.94%
Greater Manchester	46	0.29%
Hampshire	46	0.71%
Hertfordshire	10	0.18%
Kent	12	0.12%
Lancashire	73	0.63%
Leicestershire	16	0.16%
Lincolnshire	21	0.18%
Merseyside	26	0.38%
Metropolitan	280	1.55%
North Wales	64	0.58%
North Yorkshire	21	0.47%
Northants	21	0.30%
Northumbria	27	0.67%
Nottinghamshire	22	0.82%
Staffordshire	21	0.36%
Warwickshire	50	1.06%
West Midlands	84	0.96%
West Yorkshire	134	1.55%
Total	**1,134**	**0.63%**

Figure C.2 shows the completeness of returns for key data fields.

Figure C.2: Completeness of returns for key data fields

Field	Completeness
Force Name	100%
Week Number/Date	100%
Time of Stop	99.9%
VRM	99.6%
Postcode	80.5%
Ethnicity of driver	89.6%

Appendix D: Fixed penalty notices included under cost recovery

- Contrary to section 47, Road Traffic Act 1988. No MOT certificate
- Contrary to section 143, Road Traffic Act 1988. No insurance
- Contrary to section 172, Road Traffic Act 1988. Failure to supply details
- Contrary to section 87(1), Road Traffic Act 1988. Drive otherwise than in accordance with licence
- Contrary to section 42, Road Traffic Act 1988. Driver not in proper control of vehicle and S104 Road Vehicles Regulations (Con & Use) Regulations 1986 (Previously this offence has been used to deal with mobile phone offences the new offences relating to the use of mobile phones when driving have received HM Treasury approval for inclusion within the scheme as a sub group to the above offence
- Contrary to section 33, Vehicle Excise and Registration Act 1994 Failing to exhibit excise licence
- Contrary to section 42, Vehicle Excise and Registration Act 1994 Keeping/driving without registration mark
- Contrary to section 43, Vehicle Excise and Registration Act 1994 Registration mark obscured
- Contrary to section 59, Vehicle Excise and Registration Act 1994 Registration mark not fixed
- Contrary to R17 Road Vehicles (Regulations and Licence) Regulations 1971 & schedule 2, Registration mark not conforming to regulations
- Contrary to section 163(3) Road Traffic Act 1988 Failing to stop for police constable
- Contrary to R11(1) RVLR 1989 S42 Road Traffic Act 1988 Showing red light to front
- Contrary to R25 RVLR 1989 No headlights/front fog lights not lit in poor visibility
- Contrary to R54 RV (Con & Use) Regulations 1986. S42 Road Traffic Act 1988 No silencer/defective exhaust
- Contrary to R54 RV (Con & Use) Regulations 1986. S42 Road Traffic Act 1988 Failing to maintain silencer
- Contrary to R57 RV (Con & Use) Regulations 1986. S42 Road Traffic Act 1988 Noise limits & exhaust systems on motor cycles

- Contrary to section 14 Road Traffic Act 1988 S5(1)(a) and (b) MV (Wearing of Seat Belts) Regulations 1993 Failing to wear seat belt (adults) driver/passenger
- Contrary to section 15(2), Road Traffic Act 1988 Child in front passenger seat – no seat belt and Sec 5 (1)(a)(b) MV (Wearing of seat belts by children in front seats)
- Contrary to section 15(4), Road Traffic Act 1988 Child in rear passenger seat – no seat belt and Sec 8 (1)(a)(b)(c) MV (Wearing of seat belts Regulations 1993).

Appendix E: ANPR case studies

This section details some of the ANPR successes as reported by forces.

E.1 Avon & Somerset

Three arrested after ANPR hit (Brislington)

At 7.15pm Monday July 12 2004 the ANPR system alerted police to a Vauxhall Tigra which had been stolen from a home in Hanham on July 10. This vehicle failed to stop for police and a pursuit, involving two ANPR vehicles, took place. The Tigra failed to stop at a Give Way sign at the junction of Hampstead Road and Talbot Road in the Brislington area of Bristol and collided with an Audi 80 car.

The driver of the Tigra ran off and was lost following a foot chase. The front seat passenger, a 26-year-old man, was arrested and found to be an escapee from prison. The two occupants of the Audi received minor cuts and grazes as a result of the collision. Police then learned that the driver of the Audi, a 28-year-old man, was a disqualified driver who was also wanted by Wiltshire police in connection with a robbery and by Bridgwater police in connection with a theft.

The passenger of the Audi, a 22-year-old man, was found to be wanted for escaping from Dorchester Prison and also in connection with a theft in Bridgwater.

Superintendent Lawrie Lewis, head of the force's Road Policing Unit, said: "We are determined to deny criminals the use of our roads. The ANPR system is camera technology designed to target those who flout the law, and protect those who respect it. This latest incident is an excellent example of how effective the ANPR system can be. As a result of one identification, we have arrested three people. This sends out a strong message to any criminals planning to use roads in the Avon and Somerset force area; we are watching."

E.2 Cambridgeshire Constabulary

ANPR and trading standards haul in counterfeit goods

- An ANPR stop was made recently by Cambridgeshire officers as a result of intelligence received from Trading Standards. Officers found counterfeit goods and over £500 from the sale of these goods at a nearby car boot sale. Officers were able to arrest the offender and together with Trading Standards were able to supply the evidence needed to present at trial.

Peterborough Police pull in serial offender thanks to ANPR

- Officers in Peterborough had pursued an individual who was driving a stolen sports car on more than one occasion. His driving was thought to be extremely dangerous and officers had been unable to stop the vehicle and make an arrest. Using intelligence, two ANPR officers selected a location in order to find and stop the vehicle. A short while later the officers identified the individual walking away from the, now parked, stolen car. He was arrested and later admitted nine charges, including three for dangerous driving, taking without owners consent, aggravated burglary, driving while disqualified and driving without insurance.

ANPR and council initiative in Peterborough a success

- During an initiative in early 2003 ANPR officers teamed up with Peterborough City Council's CCTV Unit to conduct a two-week operation in Peterborough. Four CCTV cameras were linked into the ANPR system, with an officer working in the CCTV control room to monitor and help direct resources to stop those cars identified. During the campaign:
  - 78,125 registration numbers were read
  - 352 vehicles were stopped
  - 13 people were arrested for various offences
  - 41 people were reported for driving offences
  - 153 vehicles were reported to the DVLA for no tax
  - 260 people were required to produce their documents
  - 24 fixed penalty notices were issued for minor traffic offences
  - 22 vehicles were found to have defects which had to be corrected
  - 5 searches were made
  - £3,000 worth of property was recovered (a stolen car)

Record breaking find for ANPR officers

- ANPR officers on the Fletton Parkway, Peterborough, in October 2003, found a stolen vehicle less than 40 minutes after it was stolen from an address in another county. The vehicle – a Land Rover Defender – that showed up as being stolen was reported stolen from Kislingbury, Northamptonshire at 3pm. After a short follow to Boongate, Peterborough the man driving the stolen vehicle gave himself up to officers at 3.38pm.

E.3 Hertfordshire

Worldwide credit card scam

Professional criminals at the centre of a worldwide credit card scam were caught in Stevenage thanks to hi-tech equipment recently introduced in Hertfordshire.

“This is just one of the huge success stories from the sophisticated Automatic Number Plate Recognition (ANPR) and I have no doubt that we will have many more examples like this in Hertfordshire very soon,” said Detective Inspector Greg Cooper, who is leading the use of ANPR in the Eastern Area.

Driving crime off the county’s roads, detecting criminals and specifically targeting crime hotspots are the main advantages of the ANPR, which works by scanning literally every vehicle registration that passes in front of it and checking them against information stored in several databases, including the Police National Computer. This identifies vehicles of interest to the police, such as stolen cars or those involved in crimes. When a suspicious vehicle is recognised it can be the focus of targeted interception and enquiries.

“The equipment showed that a vehicle was being used by credit card fraudsters and was stopped by officers,” said Greg. “The car contained two men who had ten credit cards in their possession, some of which were unsigned. Further enquiries revealed that deceptions had already been committed locally but it soon became clear that we were dealing with professional criminals who were at the centre of worldwide credit card fraud approaching half a million pounds. They were linked to a sophisticated network for obtaining credit card numbers and manufacturing cards,” said Greg. Two men are currently awaiting trial at Crown Court.

“Just think, would that car have been stopped if it were not for ANPR?” said Greg. “Officers working as dedicated ANPR intercept teams can arrest ten times as many offenders as other officers, according to recent national statistics.”

To date several ANPR operations have been run in all areas under Operation Grip (Eastern) and Operations Raceway and Reabsorb (Central), with most activity in the Eastern area over the past few months.

Greg said: “These successful operations clearly show the potential this technology has to drive down crime and detect travelling criminals, making our streets safer. If we deny criminals the use of the road then we will be better able to enforce the law, prevent crime and detect offenders.”

The sophisticated cameras can be fitted to marked and unmarked cars and the Constabulary also has a dedicated ANPR vehicle. “The technology brings many crime fighting benefits and has a knock-on effect in increasing levels of intelligence, a positive effect on road safety and brings reassurance to the community with high visibility police operations,” said Greg.

The force has recently been successful in an application to expand ANPR and join the national Project Laser. This project, which forces had to bid to join, intends to expand the use of ANPR in a wide variety of policing environments, including linking to CCTV control rooms. The new project is being piloted in the Eastern Area, and specifically Stevenage. As part of the second phase of the scheme, a dedicated ANPR unit of seven officers has been set up.

Greg said: “ANPR is now a significant weapon in our proactive armoury in Hertfordshire and is set to revolutionise policing.”

Paul Abraham, Manager for Project Laser added: “The Constabulary intends to exploit the use of ANPR technology to reduce crime and disorder by detecting offenders. To support the technology, we will increase staff and resources dedicated to ANPR interception teams and use the technology through all delivery systems.”

Three sentenced for internationally organised counterfeit credit card racket

Three people were sentenced at St Albans Crown Court yesterday (June 7) for their involvement in a huge international credit card scam investigated by Hertfordshire Constabulary. They were arrested in Gunnels Wood Road, Stevenage on February 26, 2003 after the vehicle in which they were travelling was flagged up by Automatic Number Plate Recognition (ANPR) as being of interest to police during a pilot operation making use of that new technology.

Ngaih Lim (male), aged 46, from Hall Place, London W2 was sentenced to four years’ imprisonment having pleaded guilty to conspiracy to defraud at Luton Crown Court at a previous hearing. Kwong Wong (male), aged 34, from Highbury Park, North London was sentenced to two years’ imprisonment having pleaded guilty to conspiracy to defraud at Luton Crown Court at a previous hearing. Chen Hsiang-Ching (female), aged 28, from Hall Place, London W2 was convicted at Luton Crown Court on May 13 of Money Laundering. She received a nine-month sentence.

Sergeant George Smith from the Constabulary's Cheque and Credit Card Fraud section said: "These three are thought to have gained a substantial amount of money from counterfeit cards; and a large amount of high value goods, such as Louis Vuitton, Chanel and Prada products, was recovered from their homes during this investigation. A computer was also recovered which contained details of 488 credit cards held by genuine cardholders around the world."

During the court hearing, Lim and Wong admitted conspiring to defraud national and international clearing banks and Lim admitted being part of an organised crime syndicate. Wong admitted that he had used counterfeit cards and passports while Chen was convicted of assisting with the laundering of proceeds over a five-year period.

Sergeant Smith added: "This was a very complex investigation which involved liaison with many other forces and agencies. It is pleasing to see it reach a successful conclusion at court."

Sergeant Dougie Fishwick who co-ordinated the pilot ANPR operation in February 2003 said: "This outcome shows what a vital role this new technology can play in detaining offenders who are using our road networks. It is now routinely used across the county to provide officers with fast-time information linked to the Police National Computer and DVLA records. Through this technology police officers are alerted to vehicles used by criminals and appropriate action is taken. The message is therefore clear that offenders driving through Hertfordshire now stand a far greater chance of being detected."

E.4 Merseyside

604 arrests & £370,000 of goods seized

Merseyside Police is celebrating the success of its dedicated ANPR team which has made 604 arrests and seized goods worth more than £370,000 in the last 11 months.

The hi-tech computerised Automatic Number Plate Recognition (ANPR) system has proved to be a powerful tool in the fight against serious crime, enabling officers to put the intelligence they gather daily at the fingertips of officers out and about on the roads, at the front-line of policing.

Since the beginning of the pilot in June last year, 604 people have been arrested in Merseyside for a variety of offences including robbery, burglary and car crime after being stopped following a 'hit' on the ANPR system. Additionally, over £370,000 worth of goods, including stolen high-performance cars and a stolen heavy goods vehicle, have been recovered.

ANPR systems instantly scan number plates and have the capability to check whether vehicles may be involved in illegal activity. Officers can examine intelligence at the touch of a button on a laptop computer at the roadside, and can move at short notice to target the areas where criminals are known to be. The ANPR system can match number plates against information stored in databases, such as the Police National computer, DVLA databases and local intelligence databases, to check if the vehicles are of interest to the police such as stolen cars, or those involved in crime. And the system has the capability to check up to 3,000 number plates per hour.

Merseyside Police's ANPR team, codenamed 'Operation Laser', are out and about in Merseyside every day, working alongside Neighbourhood colleagues to track down those involved in crime.

The ANPR initiative is part-funded by retaining fines paid by criminals who drive their vehicles untaxed and uninsured. While this only covers a small part of the cost of the Force's ANPR operation, police say this hits criminals in the pocket and sees them paying for the police activity which catches them out.

Chief Constable Norman Bettison is keen to point out that this activity has nothing to do with speed checks. He said: "I've been out on Operation Laser when the officers put a road check in place. Motorists could be forgiven for thinking 'haven't the police got better things to do'. I'd like them to know that we're catching serious criminals, not speeders. Criminals are our key priority here in Merseyside and always will be while I'm here.

“Our message is very clear – if your vehicle is taxed and has an MOT, and you’re entitled to be driving that vehicle and you’re not involved in crime, then you have nothing to fear. It’s the criminals we’re after. The ones who drive in illegal vehicles with no care or thought about other road users and those involved in car or drug crime, which can have a devastating impact on our neighbourhoods and blight our lives.

“Our message to our ‘other’ audience is equally clear – if you’re involved in criminal activity, beware, because we have the technology – and the means – to stop you. ANPR allows the police to stay one step ahead of the criminals. We will continue to expand the number of vehicles fitted with ANPR and there will be no hiding place for criminals on Merseyside.”

E.5 Bedfordshire

Curb crawlers in Luton are Operation Scorpion’s latest target as Bedfordshire Police works to reduce the number of prostitutes operating in the town. Anyone caught on ANPR curb crawling will receive a letter, sent to their home address, saying they have been seen and their details registered. If they are caught a second time, they will be arrested and charged and their names and addresses will be released publicly in court. Chief Inspector Jim Saunders, from Luton Police Station, says while it is an age-old problem in the town it is still one he receives many complaints about.

“This operation will work very much as a deterrent and our message is ‘don’t come to Luton because you will be caught’. Our focus is aimed primarily on the curb crawlers rather than the prostitutes themselves. We will still be arresting the prostitutes, but, as many of them have a drugs habit, our priority will be to get them into treatment programmes. Prostitutes who appear at court are normally fined, this just forces them back out on to the street to earn the money pay their fine. We want to break the cycle and we believe we have a better chance of doing this if we can get them off the drugs.”

Considerable funding is being ploughed into bringing ANPR technology into Luton, including £30,000 which is to pay for Police Patrol Vehicles to be fitted with ANPR equipment, plus a further £100,000 which will link the technology to existing CCTV cameras in the town.

Funding for the CCTV / ANPR linked scheme is being provided by the Neighbourhood Regeneration Fund and other partnership funding. Chief Inspector Saunders added; “Using sophisticated technology such as this give us a fantastic capability. We believe that this technology will be particularly effective in tackling the problem of curb crawlers once and for all.”

Luton Police have already arrested 38 prostitutes for loitering and soliciting; twenty letters have been sent to curb crawlers and six men have been prosecuted in the past year.

E.6 Lancashire

Project Laser targets travelling criminals

Police across the county are hailing the success of a crackdown targeting travelling criminals. Since the beginning of the month, equipment has been in use to catch motorists who are breaking the law and there have already been a number of significant arrests for serious offences.

The system works by scanning passing motor vehicle registrations and checking them against information stored in a variety of databases including the Police National Computer. This can identify vehicles of interest to the police, such as stolen cars or those involved in crime. When a suspicious vehicle is recognised, it can be the focus of targeted interception and further enquiries.

In Blackpool, a stolen vehicle was identified being driven on Progress Way. The vehicle had been taken during a burglary and was also found to contain stolen property. A man and a woman from the Manchester area were arrested at the scene. He was later charged with handling stolen goods, resisting arrest, obstruction, and a variety of document offences while she was charged with allowing herself to be carried in a vehicle without the owner's consent, going equipped, resisting arrest, and obstruction.

A disqualified driver was stopped on Flensbury Way, Leyland and arrested for disqualified driving. The Chorley man was charged and remanded in custody while a woman, arrested at the same time for perverting the course of justice, received an instant caution.

When a vehicle connected to crimes in the Cheshire area was stopped in Clayton Brook, one of the occupants was arrested for theft.

Said Chief Inspector Tracey O'Gara: "Project Laser has already been responsible for a number of noteworthy arrests. We are catching criminals who are using our roads to commit crime in dangerous and illegal vehicles.

"These arrests are as a direct result of ANPR – showing what a powerful tool this piece of equipment is in the fight against crime. We have also arrested several people for possession of Class A drugs and criminals who have been on-the-run from other forces.

“The aim of Project Laser is simple – we want to deny criminals the use of our roads. It is known that motoring offences such as driving without tax and insurance are often associated with other crimes such as burglary and drug dealing. Experience has shown that when vehicles are stopped for a motoring offence this has often led to an arrest for more serious crimes.”

A vehicle is only stopped where intelligence suggests that some form of road traffic offence has been committed or when there is a known police interest in that vehicle. Law-abiding citizens have nothing to fear from ANPR.

E.7 North Yorkshire

A joint operation between Road Policing officers and the Automatic Number Plate Recognition Unit struck a series of severe blows to travelling criminals on the borders of West Yorkshire and North Yorkshire.

For four nights in February a unit went out every night with RPG officers along North Yorkshire’s borders with Leeds and Bradford, specifically hunting cross-border law-breakers.

Among the successes were 18 arrests, 21 individuals reported for summons, 12 penalty tickets were issued mostly for having no tax, one stolen car was recovered worth £9,000, £1,400 of stolen goods was recovered and cannabis and heroin was also seized.

One of those arrested, who was stopped driving a car, stolen in a burglary which took place in West Yorkshire a few days earlier, was wanted in connection with a burglary and a robbery in the Selby area . He was also wanted for questioning by South Yorkshire Police. He had been released from prison in November last year, after serving three and a half years for dwelling house burglaries. However this arrest meant his prison licence was revoked and he is now back in custody.

Three others were stopped after ANPR found that their vehicle did not have an excise licence and found to be going equipped for theft after a ten-ton hydraulic jack – frequently used to remove cash boxes from night security safes and worth about £800 – was found in their vehicle. One man was in possession of cannabis another was wanted for two assaults by West Yorkshire Police. Two were released on police bail and one was taken for questioning by West Yorkshire police officers.

And an off-duty West Yorkshire officer reported to Harrogate enquiry office that he had seen a vehicle which was circulated as being involved in an incident of making off without payment in his own force area. Within 45 minutes ANPR had picked up the vehicle and the occupants were arrested by NYP intercept officers and handed over to West Yorkshire Police.

“Some criminals in surrounding counties have a naïve belief that they can stroll into North Yorkshire and help themselves,” said Detective Inspector Ian Wills, who heads the ANPR operation. “Some of them have just had a very rude awakening!”

DI Wills is pleased with the arrests, and also with the intelligence which has now gone on to North Yorkshire’s ANPR database – and is being shared with colleagues in neighbouring forces. He said: “We now know even more about who travels where, when and with whom, and what routes they like. It all adds to the intelligence picture that enables us to drive back the travelling criminals.”

And he was particularly happy with the efficiency of the ANPR system. He said: “Before ANPR, night-time checks would necessarily involve stopping quite a number of entirely innocent drivers. Now we can much better target the people we want to know about and so minimise public inconvenience.”

E.8 Surrey

An operation to target Waverley and Guildford’s most prolific car criminals as part of Operation Gallant II, has resulted in 48 arrests in just three weeks. Operation Gallant II was launched in West Surrey last month in an attempt to further reduce thefts from and thefts of cars, and linked in with the countywide vehicle crime campaign as part of Operation Safer Surrey.

Analysis was carried out to identify the most prolific car criminals believed to be responsible for a large proportion of the division’s vehicle crime. These offenders were then targeted using a wide range of measures, including the use of the ANPR system, which alone resulted in many of the arrests.

ANPR is an innovative system, which scans vehicle registrations and checks them against information stored in various databases, including the Police National Computer, to identify vehicles of interest to the police, such as stolen cars and those involved in crimes. When a suspicious vehicle is recognised, it can be intercepted by officers further down the road. Road traffic offences are often linked to other criminal conduct and stops for such offences, often lead to the arrest of criminals unlawfully at large.

Other measures used included increased use of stop and search powers and more frequent checks of bail conditions, including non-association orders and curfews. Maximum use was made of traffic offences to disrupt the activities of persistent offenders, including impounding unsafe vehicles and prosecutions for driving with no insurance. Analysis to link offenders to crimes, by the method in which it is committed to generate arrests and search warrants was also used. Criminal informants were asked to provide more information about persistent offenders, and patrols were increased in hot spot areas, such as beauty spot car parks.

Of the 48 arrests, 11 people were arrested for theft of a motor vehicle, four were arrested for attempted theft of a motor vehicle and seven were arrested for theft from a motor vehicle. Further arrests (two) were also made for thefts of tax discs. Arrests were also made for aggravated vehicle taking (two), driving while disqualified (three), driving while over the legal alcohol limit (eight) and being unfit to drive (two). Individuals were also arrested for failing to stop, breach of bail and assault. Three arrests were made for criminal damage and three arrests were made for historic offences after those responsible were linked through DNA tests.

Of those arrested, 13 were charged, 24 were released on police bail, six were released with no further action, four were remanded in custody and one received a caution.

The operation to target prolific car criminals was based on last year's successful Operation Bugle, which resulted in 116 arrests in three months. 17 offenders who were actively targeted amassed 69 arrests between them, with seven remanded in custody. One offender who was remanded in custody asked for 54 further car crime offences to be taken into consideration. Operation Bugle also resulted in the recovery of four stolen cars, valued at a total of £30,000.

West Surrey Superintendent Kevin Deanus said: "The success of this operation proves that targeting prolific offenders, and focusing our resources effectively, does pay off. We will continue to make use of these tactics, particularly ANPR, to target known criminals and disrupt their criminal activity. We are committed to tackling both auto crime, a priority for Surrey Police, and persistent offenders and this operation has demonstrated these commitments. We will not tolerate car crime being committed in West Surrey."

E.9 West Midlands

Vehicles seized for having no tax across the West Midlands will be brought to Coventry to be crushed. Police have seized a number of vehicles since gaining new powers to tackle unlicensed cars and will start crushing on Monday.

On the first day of gaining the new powers in May 2004, 15 vehicles were taken off the streets for having no tax. Three owners paid up on the spot but the remaining 12 cars were crushed. In the first four weeks of gaining the powers officers have seized 304 vehicles and arrested 118 people. West Midlands Police were the first force in the country to take on the new powers in May.

There are currently believed to be 86,000 untaxed vehicles on West Midlands roads. Until now, there have been no powers available to police to seize vehicles being used without insurance or tax. Through the new powers vehicles will be targeted through the Automatic Number Plate Recognition (ANPR) system.

Anyone without tax will have their vehicle seized until they pay a release fee and buy tax. If the vehicles are not claimed in 14 days they will be crushed. Those worth more than £2,000 will be sold. Police say a large proportion of unlicensed vehicles are used by criminals, and the majority end up being abandoned or torched.

Appendix F: National ANPR project board membership

- Home Office Police Standards Unit – Chair
- ACPO representatives including:
  - Head of Road Policing
  - Chair ACPO ANPR Steering Group
  - ACPO Crime Business Area
  - National ANPR Co-ordinator
- Police Information Technology Organisation
- Department for Transport – Licensing Roadworthiness & Insurance
- Department for Constitutional Affairs
- Crown Prosecution Service
- Driver and Vehicle Licensing Agency
- HM Treasury
- ACPOS / Scottish Police Information Strategy (Observer)

Appendix G: Recorded offence guidance

Recorded offences are offences that must be notified by police forces to the Home Office and then published as part of the National Crime Statistics. These are the offences that are counted for the purposes of the Narrowing the Justice Gap target, 1.2 million offences to be brought to justice in 2005-06.

Recorded Offences are:

- All 'either way' and 'indictable only' offences and a small number of summary offences of:
  - racially aggravated harassment
  - causing intentional harassment
  - fear of violence
  - causing harassment, alarm or distress
  - indecent exposure with intent to insult any female
  - assault on a constable
  - obstruction of a constable doing their duty
  - common assault and battery
  - assaulting a person assisting a constable
  - assaulting a prison officer
  - resisting / obstructing a prison officer
  - assaulting a court security officer
  - resisting or obstructing a court security officer
  - supply of articles for administering controlled drugs
  - unauthorized access to computer material
  - unauthorized taking of a motor vehicle
  - unauthorized taking of a conveyance other than a motor vehicle or cycle
  - aggravated vehicle taking
  - taking a cycle without consent
  - interference with motor vehicles
  - tampering with motor vehicles.
- All other summary offences are not recorded offences including:
  - loitering or soliciting for the purposes of prostitution
  - driving with excess alcohol / failing to provide a breath specimen
  - driving while disqualified.

If a summary offence is not a recorded offence then it is does not count towards the Narrowing the Justice Gap target.

Recorded offences should not be confused with ‘Recordable offences’. Recordable offences are those that have to be recorded on the Police National Computer by law, resulting in a person having a ‘criminal record’. The category of Recordable offences includes indictable, either way and most summary offences and is a much larger group of offences than the category of Recorded offences.

Appendix H: References

New Research on Uninsured Drivers, Association of British Insurers (March 2004)

Response of The Association of British Insurers on behalf of Motor Conference and the MIB to The Greenaway Review of Compulsory Motor Insurance and Uninsured Driving, ABI (February 2004)

Vehicle Excise Duty Evasion, DFT (2002)

Road traffic: by type of vehicle: 1992-2002, DfT (2004)

Narrowing the Justice Gap Framework, Home Office (October 2002)

Illegal Parking in Disabled Bays: A Means of Offender Targeting, Sylvia Chenery, Chris Henshaw and Ken Pease (1999, Home Office RDS)

The Criminal History of Serious Traffic Offenders, Gerry Rose (2000, Home Office RDS)

Motoring Offences and Breath Test Statistics, Home Office (2004)

Roles and responsibilities review Highways Agency/ACPO, PA Consulting Group (2003)

Engaging criminality – denying criminals use of the roads, PA Consulting Group (November 2003)

Diary of a Police Officer, PA Consulting Group (2001)

Uninsured Driving in the United Kingdom, Professor David Greenaway (July 2004)

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