

First generation ANPR systems have been extremely successful in detecting simple crimes: tracking known vehicle registration numbers (VRMs), finding stolen vehicles and prosecuting uninsured or un-taxed road users. While these achievements are significant, it is only when ANPR data is enriched with information from other sources, particularly operational intelligence, that its full power becomes apparent.

Intelligent policing with next generation ANPR

Intelligent ANPR is at the core of the Association of Chief Police Officers (ACPO) *ANPR Strategy for the Police Service 2005/2008: Denying Criminals the Use of the Roads*, with the emphasis on developing local, cross-border and national intelligence applications for ANPR and integrating it with other criminal intelligence analysis, particularly developing the potential of ANPR in relation to post-incident investigation and intelligence profiling.

Since it was integrated into the National Intelligence Model (NIM), ANPR has become an integral part of an intelligence-led approach to policing.

IP ANPR (intelligent policing automatic number plate recognition) is the result of Kent Police taking the lead for ACPO to develop the use of ANPR as a strategic and tactical assessment tool and as a means of identifying and targeting hotspots, trends and nominals.

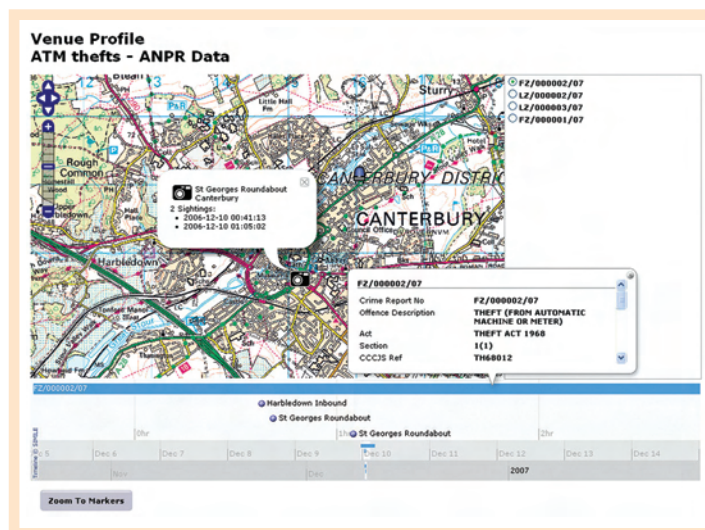
Working with software solutions supplier IPL, Kent Police has addressed one of the key targets in ACPO's strategic document with IP ANPR: "Developing sophisticated, analytical tools that can extract data from

ANPR systems and import this into other analytical products, allowing analysis of patterns to guide deployments and providing proactive intelligence on the profile of vehicle-borne criminality and integrating it with other criminal intelligence analysis, such as crime pattern analysis, to identify any connection between criminal activity and criminal movement on the roads."

Recognising that efficient use of IT software for tracking vehicle movements had become a vital requirement of 21st century policing, Kent Police commissioned the development of a software application that had the ability to view vehicle whereabouts through maps and charts. This activity has also helped to highlight anomalies and links with other intelligence data in order to achieve optimum crime detection rates.

IP ANPR, a powerful investigative solution, combines automatic number plate recognition data with police intelligence and has already shown significant benefits to crime investigation at the force.

“Using IP ANPR for criminal investigations simplifies the process... it pulls together all the strings of data on one person, saving a great amount of investigation time.”



Vehicle sightings - location and timeline

Best Intercept Locations					
Camera Location	Day	Time	Sightings	Secondary Sightings	
St Georges Roundabout Canterbury	Friday	23:00 to 23:30	4	3	
St Georges Roundabout Canterbury	Friday	23:30 to 00:00	3	4	
St Georges Roundabout Canterbury	Saturday	23:30 to 00:00	4	2	
St Georges Roundabout Canterbury	Saturday	23:00 to 23:30	2	5	
St Georges Roundabout Canterbury	Tuesday	02:00 to 02:30	4	0	
St Georges Roundabout Canterbury	Saturday	22:00 to 22:30	3	2	
St Georges Roundabout Canterbury	Wednesday	20:00 to 20:30	3	1	
St Georges Roundabout Canterbury	Wednesday	22:30 to 23:00	3	1	

Recent Sightings			
VRM	Camera Location	Day/Time	
GASSRAD	St Georges Roundabout Canterbury	23/12/2006 14:52:03	
GASSRAD	Canterbury Road Birchington - Westbound	16/12/2006 04:30:22	
GASSRAD	Canterbury Road Birchington - Eastbound	16/12/2006 04:09:02	
GASSRAD	Harbledown Outbound Canterbury	10/12/2006 01:08:42	
GASSRAD	St Georges Roundabout Canterbury	10/12/2006 01:05:02	
GASSRAD	St Georges Roundabout Canterbury	10/12/2006 00:41:13	
GASSRAD	Harbledown Inbound Canterbury	10/12/2006 00:37:53	
GASSRAD	Sturry Road Inbound Canterbury	27/11/2006 00:44:00	

Summary of most significant vehicle sightings

Operational scenario



In the first six months of use at Kent Police, IP ANPR significantly reduced the cost and time required for collection, preparation and manipulation of crime detection data.

IP ANPR has also helped intelligence analysts by significantly reducing the cost of preparing standard NIM analytical products

ANPR data has historically proved useful in crime detection. Millions of car journeys across the country are recorded through the extensive fixed and mobile CCTV and ANPR camera infrastructure.

Local authority CCTV cameras are often converted to read licence plates on behalf of the police, adding to the 10 million drivers' journey details which are logged each day throughout the country. These details are used by forces to aid investigations ranging from low-level crime to counter-terrorism cases.

The problem for forces was utilising the ANPR data to make connections with crime reports, statistical and behavioural data. Unlocking hidden value within data is a process which can take a great deal of effort with conventional investigation methods, but one for which intelligent IT software is ideally suited.

The IP ANPR software developed in conjunction with Kent Police is unique in combining intelligence and ANPR data into a powerful toolset able to detect and investigate serious and complex crime. Through detailed analysis of vehicle movements, IP ANPR reveals patterns of behaviour which, when linked to other intelligence data, provides forces with a powerful investigative tool. Importantly, it builds on existing investment in ANPR and intelligence data and does not add to the data administrator's burden.

IP ANPR has now been successfully rolled-out at Kent Police by IPL. The analytical software forms part of IPL's 'Intelligent Policing' product suite, which also includes IP Map; a free and easy-to-use open source tool

Picture the scenario: Four jewellery shops, within close vicinity to each other, have been raided in the last three months. In all cases a get-away vehicle has been abandoned a short distance away, with the robbers presumed to have transferred to another vehicle.

Officers needed to resource and link a series of information assets to trace the robbers quickly and cost effectively – source details of vehicles, their geographical movements and correlations with any crimes, locate criminal records, crime locations and find that all-important link in the data which could help solve the investigation.

"Using IP ANPR for criminal investigations simplifies the process without a doubt. IP ANPR pulls together all the strings of data on one person, saving a great amount of investigation time," explained Chief Inspector Richard Watson, Kent Police's force leader of ANPR

Viewing operational data through IP ANPR

From IP ANPR the user performs a crime series search in the vicinity of the abandoned cars for a short time window just after each robbery. Results show one vehicle (VRM1) that was in the area of three of the four crimes. The system shows this to be linked to a nominal (N1)

who is also associated with another nominal (N2) and that N2 has a previous conviction for armed robbery.

The system shows N2 to be the linked to a van (VRM2).

Further searching in IP ANPR reveals

that VRM2 displays some anomalous behaviour in the 48 hours after each robbery. Specifically it can be shown that, in each case, it took the same journey to an estate 10km away. IP ANPR shows that there is another nominal (N3) living here with convictions for handling stolen goods.

IP ANPR is thus able to help quickly target resources to achieve the best effect, saving months of conventional investigation.

The screenshot displays three main sections of the IP ANPR interface:

- Vehicles:** A table listing search results. The first entry is a GASSRAD RED FORD MONDEO on 25/05/2007. A 'View Vehicle' pop-up shows details for a Vauxhall Cavalier (N2739U) with a green color and blacked-out windows.
- Locations:** A table listing search results. The first entry is Wellington Street, Maidstone, Kent, on 23/08/1996. A 'View Location' pop-up shows details for an occupied business at Wellington Street, Maidstone, Kent, with a grid reference of 577658 134899.
- Links:** A table showing connections between records. It lists connections to 'LANSHIRE CAT 8 HOMINALS' (11/05/2007), 'LANSHIRE CAT 8 HOMINALS' (25/05/2007), and 'NEX OFFENDERS' (11/05/2007). A 'View Vehicle' pop-up shows details for a GASSRAD van (VRM2) with silver wheels.

Image: IPL

integrating Ordnance Survey data. It creates integration between intelligence data and maps, timelines, charts and tables created with ANPR data. IP ANPR then reveals patterns of behaviour.

Chief Inspector Richard Watson, Kent Police lead on ANPR, commented: "One of the difficulties around policing is being swamped by data. IP ANPR allows us to efficiently filter through this mass of information to find exact details."

For example, in a common assault investigation by Kent Police, further analysis of a crime report using IP ANPR revealed that a suspect vehicle was registered locally in Kent. The vehicle details were loaded to the mobile ANPR vehicle and, as a result, the ANPR team arrested a suspect who is currently on police bail pending further enquires.

A spokesperson for Kent Police explained: "The tool has a wide range of uses including investigation of missing and vulnerable persons, community policing issues, crime investigation (including serious and organised crime) and crime reduction strategies.

"To date we have performed over 250 searches with approximately 40 per cent resulting in crime information reports. We have had many very positive comments from users."

Chief Insp Watson added: "Using IP ANPR for criminal investigations simplifies the process without a doubt. IP ANPR pulls together all the strings of data on one person, saving a great amount of investigation time."

Operational intelligence

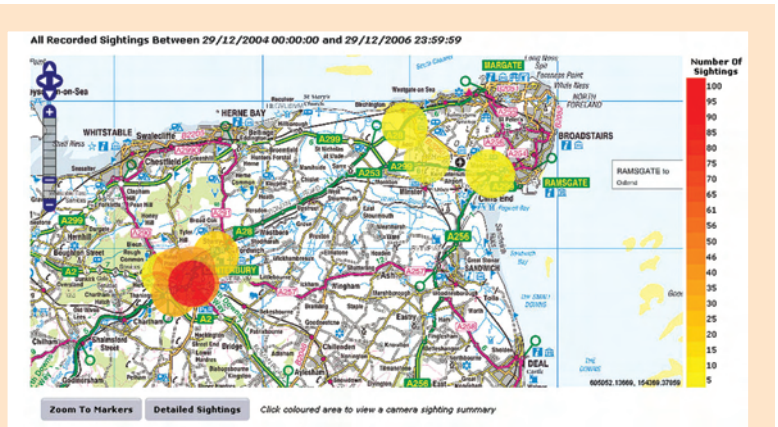
The first generation ANPR systems have been extremely successful in detecting simple crimes, for example tracking stolen vehicles and prosecuting uninsured drivers or un-taxed road users. But it is when this ANPR data is enriched with information from other sources, such as operational intelligence, that the full power of IP ANPR becomes apparent.

Intelligence and other information assets, regardless of source, fall into one of six key categories in the software: events, locations, objects, people, communications and organisations. IP ANPR will find the connection between these and make links which may have taken conventional investigation methods a great deal longer.

With IP ANPR, the maps, timelines, charts and tables created with ANPR data are able to be viewed in the context of other intelligence, such as crime scene, crime series, pre-crime visibility, MO (modus operandi), suspect groups and other data. With all this data visible, lifestyle and offending hypotheses can be formed and tested, leading to greater clear-up rates.

An inbuilt geographic information system (GIS) leverages Ordnance Survey data already subscribed to by the forces under the Mapping Services Agreement (MSA).

IP ANPR makes a force's information assets work smarter. It helps get answers to difficult questions spanning multiple information sources in real-time – and it can be used by operational users, not just intelligence analysts.



Analysis of vehicle sightings by location.

From an intuitive web browser interface, non-analyst users can search and navigate associations. With IP ANPR users can, from one system, move from detailed analysis of vehicle movements to freely navigate associations with operational information on people, events, locations, objects, etc, and then back again to look at vehicle movements. The ANPR information is displayed spatially, chronologically, and statistically (using street maps, timelines, charts, and tables) and allows anomalous behaviour to be highlighted. But the real power of IP ANPR is being able to see this information in the context of other intelligence such as crime scenes, crime series, pre-crime activity, MO signatures, suspect groups, etc. Having all this information visible from one system allows lifestyle and offending hypotheses to be formed and tested, leading to greatly improved clear-up rates.

Viewing operational information linked a nominal.

For example, IP ANPR can determine:

- How many Category Bs go out and back on a particular stretch of road on a Wednesday between 4pm and 6pm.
- How many sex offenders go into a given town centre on a Saturday night between 11pm and midnight.
- How many sex offenders are seen in the vicinity of primary schools within a given area.
- How many Category As are seen in the vicinity of ATM robberies within a given area.

Assuming the information exists already on the force database, IP ANPR can give the answers in seconds.