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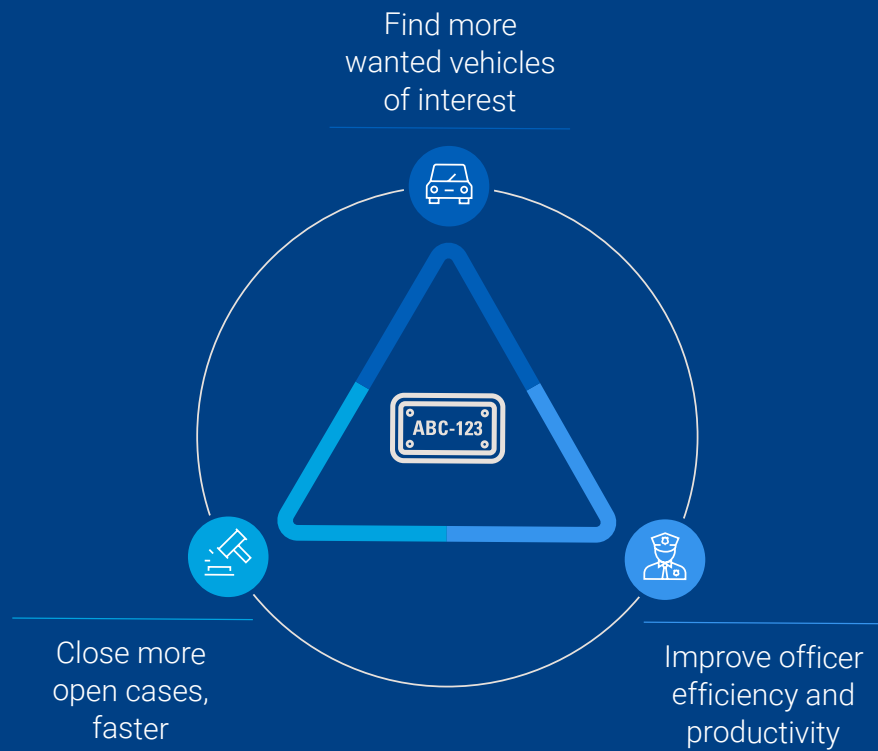
Selecting the right license plate recognition solution for your agency

A comprehensive guide to building a successful LPR program

MOTOROLA SOLUTIONS

Find more wanted vehicles of interest

ABC-123

Close more open cases, faster

Improve officer efficiency and productivity

An indispensable law enforcement tool, License Plate Recognition (LPR) systems assist agencies with real-time threat detection and mitigation, while helping close all manner of criminal investigations faster.

Why adopt License Plate Recognition?

LPR solutions take photos of vehicles, then use Optical Character Recognition (OCR) algorithms to capture and parse license plate data, along with date, time and GPS coordinates. They can also integrate with other technologies to significantly expand their core functionality. For instance, LPR detections can trigger a real-time alert to improve situational awareness, be searched and analyzed for investigative insight, and be leveraged to automate processes such as traffic enforcement or access control.

Using an LPR solution automates operations to increase officer efficiency and productivity, so officers spend less time on rote activities and more time in the community, keeping residents safe.

With a range of models from multiple vendors incorporating a variety of features, selecting the right solution for your agency can seem challenging. Partnering with an experienced vendor with LPR product expertise and law enforcement know-how will ensure regulatory compliance and program success, especially given the ever-changing laws and regulations governing LPR.

Available LPR deployment options
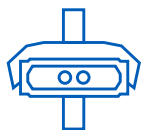
Fixed

Quick-Deploy

Video-Based

Mobile

In-Car Integrated

App-Based

This guide aims to serve as a starting point in helping you establish a successful LPR program. We've provided detailed descriptions and usage scenarios for each type of available camera system, along with guidance on supporting your system with back-end software.
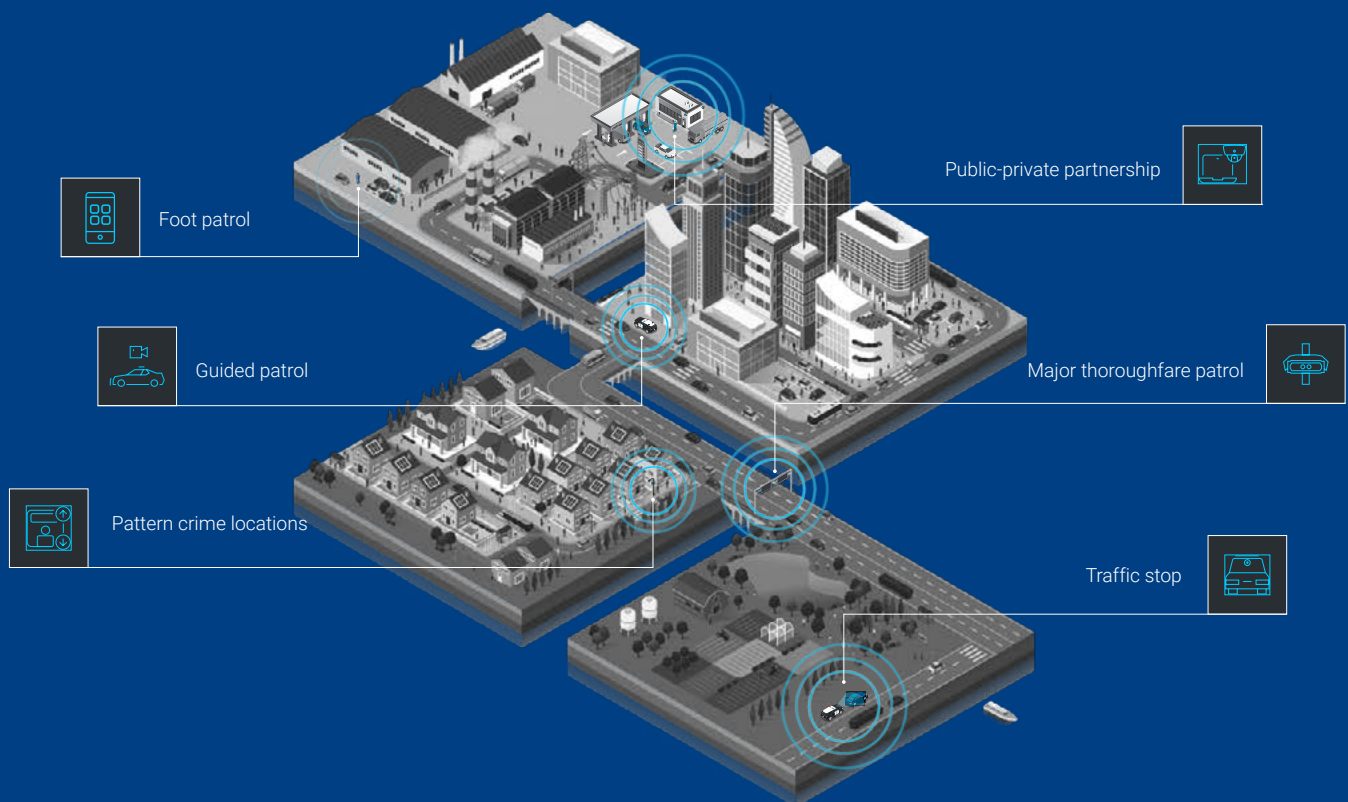
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LPR cameras:
System types, deployment scenarios, and purchasing considerations

Different situations require different types of LPR. Depending on your agency and community's needs, your LPR program will likely consist of several types of LPR cameras installed for capturing plates in various scenarios. These cameras should work together to provide you with accurate and actionable data, so that you can go from case to closure more quickly.

In addition to this guide, our LPR-equipped virtual city allows you to see how LPR can work together in a comprehensive video program.

Foot patrol

Public-private partnership

Guided patrol

Major thoroughfare patrol

Pattern crime locations

Traffic stop

Visit the LPR-equipped city: **namrinfo.motorolasolutions.com/lpr-solutions**

Fixed

Deployment overview

Fixed LPR systems are one of the most adopted types of deployments today. These cameras are permanently installed, typically on poles or other roadway infrastructure, and can provide the most data capture per dollar spent. Fixed cameras are high-performing, continuously scanning in all weather conditions - day or night - as well as reading vehicles moving at high speed.

Deployment scenarios

Highways and interstates

Owing to the high traffic volume, high-performance fixed LPR is often in place on highways, interstates and other major thoroughfares. These roads require a high rate of capture, as well as high quality bright and low-light performance in place at all times of the day. With vehicles moving at high speeds, a global shutter sensor will also ensure accurate data capture.

Jurisdiction entry points

While not all entry points will have significant traffic, a reliable plate capture capability will ensure information is captured from vehicles moving at high speed at all times of the day, so you can proactively respond to threats and mitigate incidents.
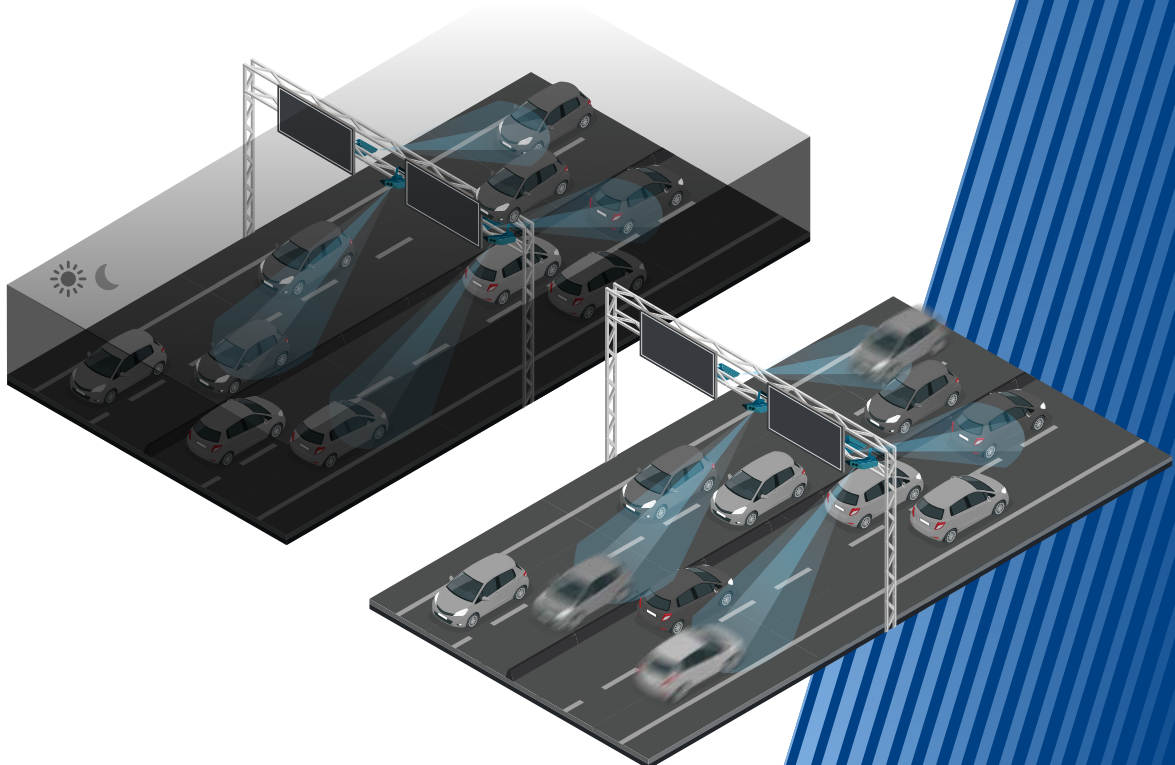
Key considerations

Capture rate
This determines how many plates the system can successfully detect; a quality camera should be able to continuously scan a high volume of cars in a short timespan.

Read accuracy
This measures the accuracy of a camera's recognition; a high performing system will read in dark environments, as well asread plates on vehicles moving at high speeds.

Lens design
Having a variety of focal lengths to choose from means cameras can be deployed as per the needs of the area. A wide field of view also helps ensure you can scan errant vehicles.

Ruggedness
Ruggedness metrics determine how capable a system is of withstanding wear and tear before being replaced, as well as indicating how well it can perform in inclement weather.

Solution recommendations

- Frame rate should be 60 frames per second (FPS) or greater
- The camera should scan continuously
- There should be no daily capture limits

- Simultaneous color and IR image capture
- Zero degradation at 150 MPH or greater
- Camera should employ a global shutter

- Lenses should span at least 6mm - 25mm
- 20-foot field of view for multi-lane capture

- Camera system should be IP68 or higher
- Should be rated ISO 16750-3 or better
- Operate at temperatures of -40°F to 140°F

Learn more

L5F Fixed LPR Camera System

Quick-deploy

Deployment overview

Quick-deploy LPR cameras are one of the newest LPR technologies on the market. With flexibility and data connectivity, the cameras can be easily moved according to the needs of the area, or they can be installed permanently. Quick-deploy LPRs can include their own stand or be mounted to common infrastructure, making them ideal for low-volume, low-speed vehicle scanning in controlled environments.

Deployment scenarios

Narcotics interdiction

By helping gather more data and evidence, quick-deploy cameras can be instrumental in shortening drug interdiction timelines. As you uncover distribution details and primary players, you can easily expand investigations, utilizing analytics to expose operational patterns - and make arrests more quickly.

Neighborhood complaints

Deployed easily and often covertly, these cameras are perfect for improving the response to community concerns as they can be quickly activated in areas experiencing an uptick in disturbances such as suspicious vehicles or parties.

Pattern crime locations

Upon determining a recurring crime series and MO, quick-deploy cameras can be placed at probable future targets, in order to identify vehicles and people of interest.

Public-private partnerships

Affordable quick-deploy LPR cameras can be owned and operated by businesses who see the value in police partnerships, who then seamlessly share images with your agency.
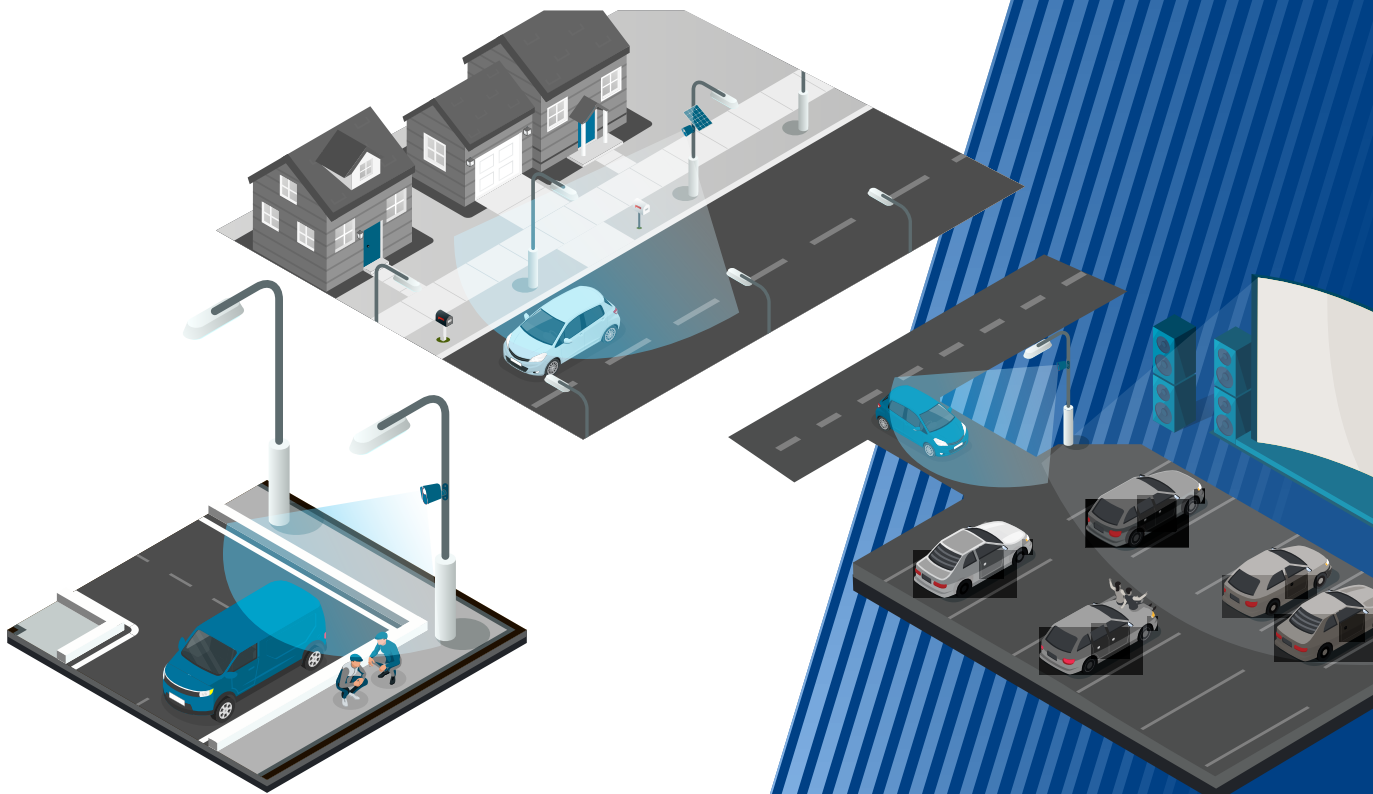
Key considerations

Time-to-benefit
This measures how long it takes to install and activate a camera, and whether it requires specialized tools or significant technical expertise to do so.

Mounting
Varying mounting options means you can place the camera in convenient locations accordingly.

Pattern crime locations
Upon determining a recurring crime series and MO, quick-deploy cameras can be placed at probable future targets, in order to identify vehicles and people of interest.

Ruggedness
Affordable quick-deploy LPR cameras can be owned and operated by businesses who see the value in police partnerships, who then seamlessly share images with your agency.

Solution recommendations

- Single, self-contained camera unit design
- Hand-holdable size - no bigger than 6 inches
- Quick-connecting Android or iOS setup app

- Pole-mount or equivalent universal straps
- Camera maneuvering via easy-lock ball joint
- Optional security enclosure available

- Solar power with at least 10-watt panel
- AC or DC direct power connection
- Battery power with 100-watt hours or more

- Major cellular carrier support
- Bring-your-own-SIM cellular flexibility
- Wi-Fi connectivity option

Learn more

L6Q Quick-Deploy LPR Camera

Mobile

Deployment overview

A highly adopted system, mobile LPR involves between one and four cameras continuously scanning around the vehicle they're mounted on. Drivers can receive real-time alerts from within the car, typically through a software interface on a mobile computer or tablet device. These cameras are ideal for helping to keep officers safe and aware of threats, as well as guiding patrol efforts based on hot plate hits.

Deployment scenarios

Traffic stops

Mobile LPR can be the first line of defense for officers during a traffic stop. With high-performance detection and immediate recognition, officers are alerted to any outstanding wants or warrants associated with a vehicle they've pulled over, allowing them to manage the incident appropriately.

Guided patrol

Turn passive patrolling into active law enforcement with mobile LPR. High-volume scanning and accurate detection of hot listed vehicles can provide officers with automated direction on BOLOs and vehicles with warrants, bringing more criminals to justice, more efficiently.

Investigations

While at the scene of a crime, canvassing nearby vehicles is essential in helping to locate potential witnesses who can help solve a case. Mobile LPR speeds up this process, eliminating manual, time-consuming processes.
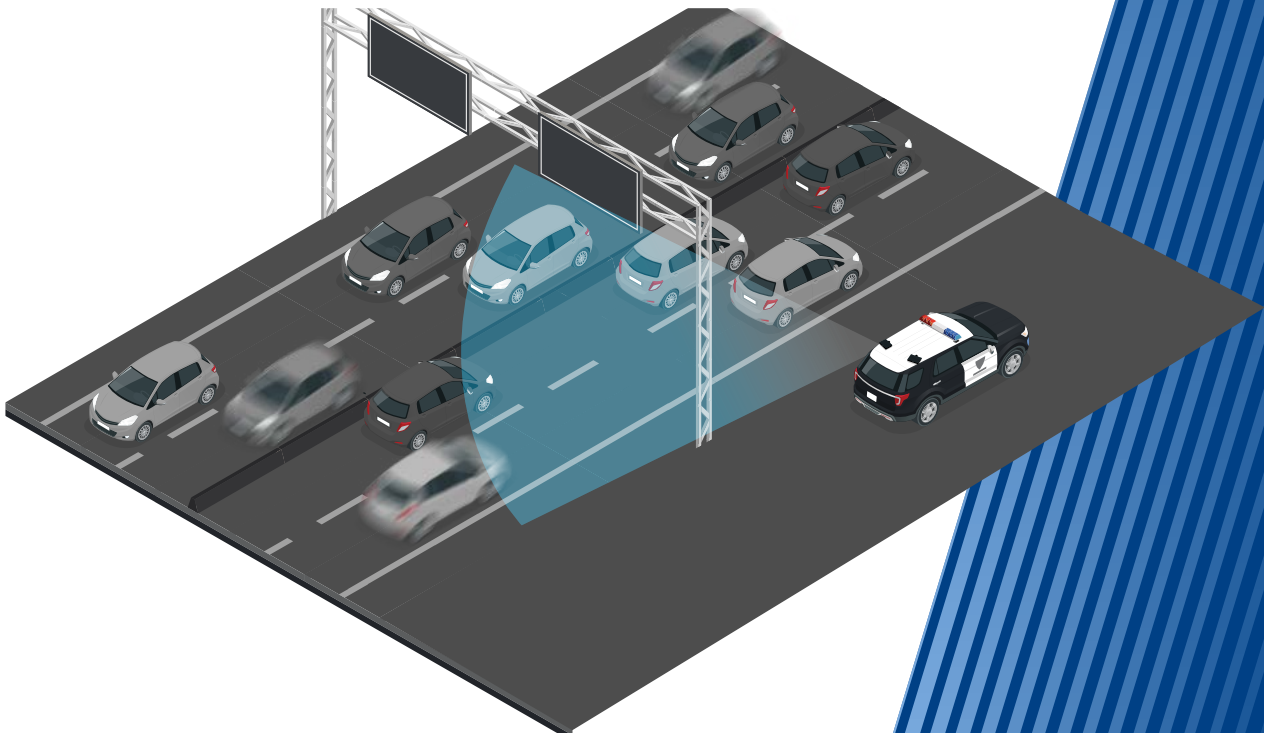
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This determines how many plates the system can successfully detect, a quality camera should be able to continuously scan a high volume of cars in a short timespan.

Read accuracy
This measures how accurate a camera's recognition is - a high performing system will read in dark environments, as well as reading plates on vehicles moving at high speeds.

Lens design
Having a variety of focal lengths to choose from means cameras can be deployed as per the needs of the area. A wide field of view also helps ensure you can scan errant vehicles.

Ruggedness
Ruggedness metrics determine how capable a system is of withstanding wear and tear before being replaced, and indicates how well it can preform in inclement weather.

In-car software
This should be easy to use and adopt for drivers, it should run without distraction in the background, and be consistent with other software officers are using.

Solution recommendations

- Frame rate should be 60 FPS or greater
- The camera should scan continuously
- There should be no daily capture limits

- Simultaneous color and IR image capture
- Zero degradation at 150 MPH or greater
- Camera should employ a global shutter

- Lenses should at least span 6mm - 25mm
- 20-foot field of view for multi-lane capture

- Camera system should be IP68 or higher
- Should be rated ISO 16750-3 or better
- Operate at temperatures of -40°F to 140°F

- Audio and visual alert configurability
- Local and network-wide searching
- Light and dark modes interface options
- Option to run in the background

Learn more

L5M Mobile LPR Camera System

11

In-car integrated

Deployment overview

In-car integrated LPR enhances officer safety by enabling the detection and recognition of license plates on vehicles in close proximity to, and in the front of the patrol vehicle. However, as the camera is located inside the car and it doesn't leverage a dedicated system designed for this purpose, integrated LPR has some shortcomings, including difficulties detecting in low-light and detecting vehicles moving at high speeds.

Deployment scenarios

Traffic stops

In-car integrated LPR is an effective tool for officers during a traffic stop. With highly capable detection and recognition, officers are alerted to any outstanding wants or warrants associated with the vehicle they have pulled over, so they can approach it appropriately.

Key considerations

Capture rate

This determines how many plates the system can successfully detect, a quality camera should be able to continuously scan a high volume of cars in a short timespan.

Driver safety

The LPR capability on an in-car system should be intuitive enough that officers can enable scanning without taking any actions.

In-car software

This should be easy to use and adopt for drivers, it should run without distraction in the background, and be consistent with other software officers are using.

Solution recommendations

- There should be a panoramic field of view

- The camera should scan continuously

- There should be no daily capture limits

- Should not require repositioning for LPR

- Critical sightlines should be unobstructed

- Blind spots should not be created

- Audio and visual alert configurability

- Local and network-wide searching

- Light and dark mode interface options

- Option to run in the background

Learn more

Video-based

Deployment overview

Video-based LPR uses existing camera feeds and runs the LPR algorithm over the top of the video to detect and recognize plates, so it can be deployed using your existing system for a cost-effective, easily integrated option.

Deployment scenarios

Facilities security

Video-based LPR is an excellent option for areas that you're already actively monitoring with video surveillance, such as police stations, a dispatch center or other city-owned buildings for which your agency is responsible for securing and protecting.

School security

With an emphasis on protecting students and teachers at an all-time high, relationships are strengthening between schools and law enforcement, Video-based LPR can detect and respond to banned vehicles on premises.

Public-private partnerships

Many businesses have existing video systems in place and wish to partner with police. Video-based LPR allows images to be seamlessly shared with your agency - without an extensive upgrade.

Key considerations

Camera requirements

Determine whether expensive, top-of-the-line cameras are required, or if they can work with most modern cameras with modest specs.

Deployment options

To ensure you fit within budget requirements, determine how the video-based LPR solution is deployed.

Solution recommendations

- Resolution requirement no more that 720p
- Frame rate requirement no more than 15 FPS

- Centralized or distributed architectures
- Optional Video Management System (VMS) deployment requirement
- Zero limits on number of cameras
- Real Time Streaming Protocol (RTSP) or Open Network Video Interface Forum (ONVIF)-compliant output

Learn more

App-based

Deployment overview

App-based LPR is convenient for license plate and vehicle data capture when a deployed camera doesn't have a clear line of sight to a plate. This type of LPR can also capture hot hit alerts, keeping officers informed even when they're away from their vehicle.

Deployment scenarios

Investigations

While on scene, canvassing nearby vehicles is essential in helping to locate potential witnesses. App-based LPR can aid in recording plate information and eliminate a hand-written, error-prone process; officers can simply walk or drive by and take a picture or video.

Foot patrol

For officers on foot, app-based LPR is an essential tool for license plate and vehicle data capture. Using their mobile device, they can easily take a picture of a suspicious vehicle or use it during a field interview to document details of the interaction.
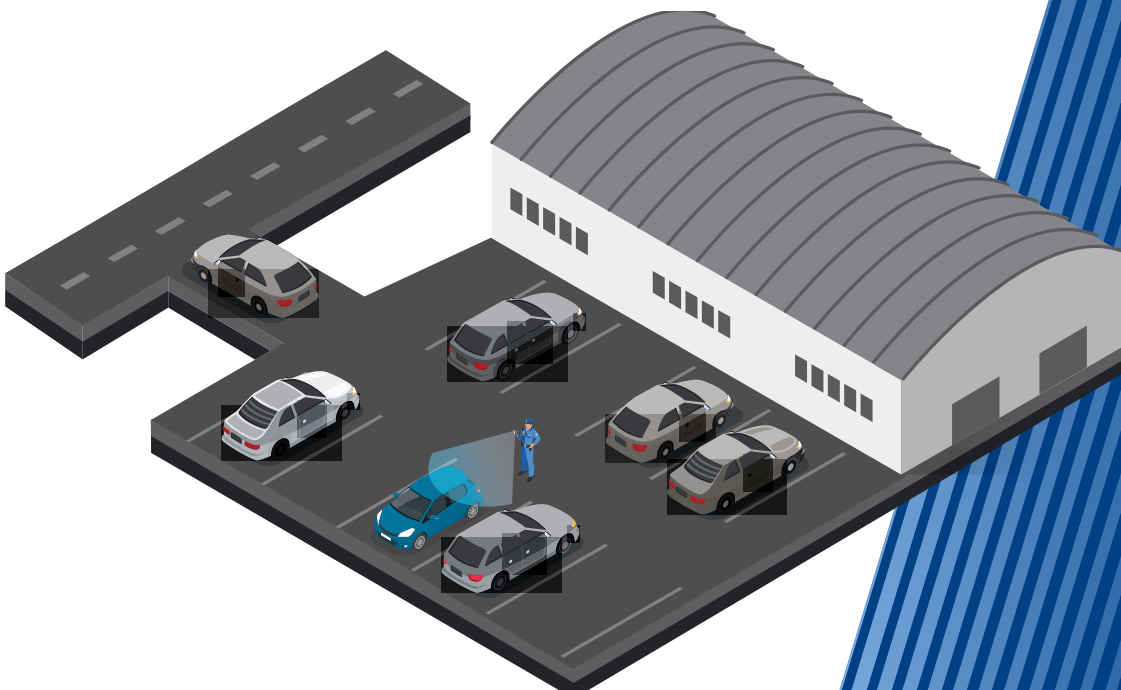
Key considerations

iOS

Operating system

The ability to run an application on devices officers already rely on aids accessibility. It provides a familiar user experience, simplified management and overall efficiency of use.

Plate capture

A variety of data collection options, including scanning plates through streaming video or from a single image capture or upload, ensures officers productivity.

Hit alerting

Beyond just capturing data, determine how your LPR app can ensure officers are informed of vehicles of interest so they can take appropriate action and stay safe.

Data security

Ensuring data is stored securely avoids questions around validity. Determine how it's stored, if it's accessible through other apps on the device, and how users are authorized.

Solution recommendations

- Available on Android or iOS
- Download from Google Play
  or Apple App Store

- Capture single license plate images
- Multi-plate capture via video
- Upload images from phone gallery

- Push notification alerting

- Data erased from device after closing app
- Segmented, isolated data storage
- User login with optional PIN method

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Mobile Campanion

License Plate Recognition software: Search, analysis, alerting, data management, security and support

Searching and analytics

When it comes to LPR data, its most basic investigative use is determining where a vehicle of interest has previously been seen. This is easy when you have a full license plate to go off of, but what really makes an LPR system valuable is its ability to also accommodate partial and wildcard searches in instances where a witness only caught a couple of characters of the plate.

But what happens when you have no characters at all? Maybe a victim only knows the make and model of a perpetrator's car, or even just that a vehicle was present. This is where a location-based search capability is helpful. It allows you to set a timeframe and proximity to a location, as well as year, make and model parameters to generate.

In addition to providing sophisticated search options, look for a system that does more with your data and helps you to capture more leads. Some of the most advanced analytic features that provide the most value to agencies include associate analysis, convoy analysis and locate analysis. Associate and convoy analysis enable you to identify vehicles connected to your identified vehicle of interest. This can help you get a better understanding of criminal networks perpetrating anything from trafficking and smuggling to burglaries and thefts. Locate analysis delivers additional insight on vehicles of interest by determining the most probable location of the vehicle. This feature is effective in quickly finding a vehicle of interest involved in a violent crime, a missing person or an abduction.

Key functionality to consider

- Full, partial & wildcard plate search
- Single and multi-location-based search
- Year, make, model & color search filtering
- Associate & convoy vehicle analysis
- Vehicle locate analysis & prediction

VehicleManager
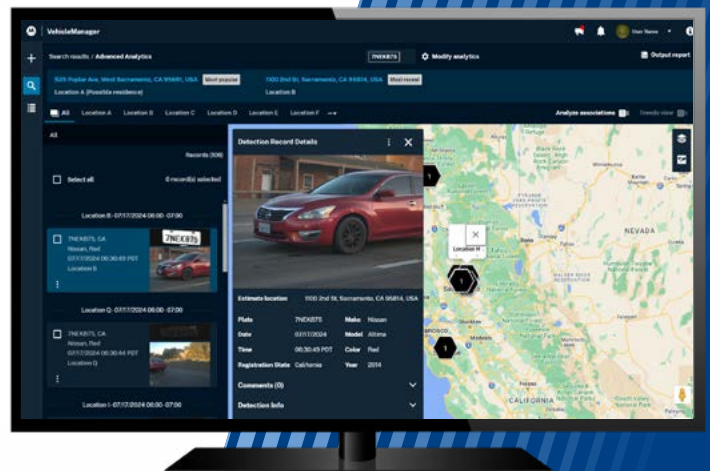
Hot Lists and Alerting

Another often-used LPR capability is creating hot lists and configuring alerts for sightings of vehicles of interest. When evaluating a solution, first consider whether the hot list and white list creation, as well as access, should be permission-based. It makes everyone's job more convenient to not only have agency-wide lists but to enable users to create their own lists for specific cases they're working on. Additionally, outside of your agency, it's important to be able to have access to other agency, state and national lists to facilitate better collaboration.

Once you have created, shared and subscribed to hot lists, determine how you'll receive essential alerts. Most solutions should facilitate email and text message-based alerts for individual users and groups, based on the hot lists they have access to. Additional notification channels to consider include mobile application-based alerts which facilitate push notifications on any Android or iOS device, as well as a dedicated alerting client that can run at a workbase such as dispatcher's workstation. Lastly, the ability to directly integrate alerts into other systems, such as call handling, computer-aided dispatch systems or a real-time crime center solution are also highly beneficial.

Key functionality to consider

- User, group or agency hot list creation
- Simple hot list sharing and subscriptions
- Email and text message-based alerting
- Mobile application/push notifications
- Easy-to-use dedicated alerting client
- System-integrated alerting capabilities
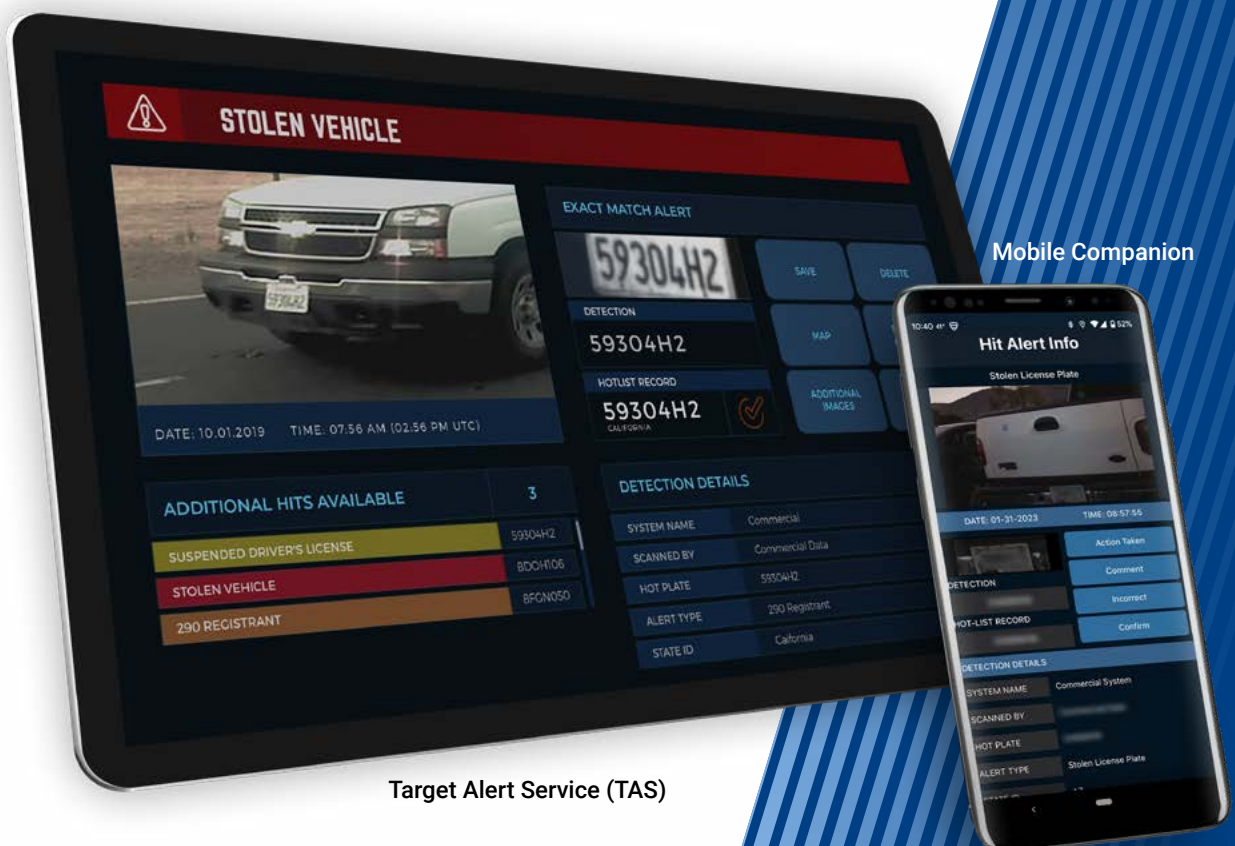
Mobile Companion

Target Alert Service (TAS)

Data Management

As all law enforcers will be aware, investigations aren't cleanly completed in a matter of days. It takes months to build a case, gather evidence, follow up on leads, identify suspects and make arrests, not to mention make prosecutions. As a result, having full control of your data retention and ownership is paramount. A system that allows you to set your own data retention policy, rather than an arbitrary one dictated by a vendor, means you can preserve data as long as is required to close a case - as well as meet your specific state and local requirements for data retention. You should be the owner of your data, not the vendor, so should you leave and wish to take your data with you, you can.

Similarly, data sharing is another important element of an LPR program. As we know, criminals don't abide by jurisdictional boundaries, especially when they are on the run. Agency-controlled data sharing between both neighboring and nationwide agencies can help you generate stronger leads and capture more criminals. Additionally, data-sharing with businesses and community groups leveraging LPR is effective in fostering strong community relationships and partnerships, co-creating better public safety together. In such partnerships, setting a clear understanding and expectation for policy and process is critical; consider the ease with which you can create a Memorandum Of Understanding (MOU) between yourself and those you're sharing data with.

Key functionality to consider

- Agency-defined data retention policy
- Complete agency data ownership
- Preservation function for critical data
- Agency-to-agency data sharing
- Enterprise-to-agency data sharing
- Built-in MOU templates

Privacy and security

Your system of choice must be compliant with the Criminal Justice Information Services (CJIS) Security Policy, which provides the most comprehensive framework, informed by the National Institute of Standards and Technology (NIST) and the FBI. This will ensure that your data is protected by dictating parameters for physical security, redundancy, access control, audit functionality, encryption of data at-rest and in-transit, and compliance regulation.

Justification fields for use of certain features are also useful - they provide a record of why a user is employing the solution. This can address privacy concerns and boost community buy-in around your use of LPR technology.

Key functionality to consider

- Agency-defined data retention policy
- Complete agency data ownership
- Preservation function for critical data
- Agency-to-agency data sharing
- Enterprise-to-agency data sharing
- Built-in MOU templates

VehicleManager
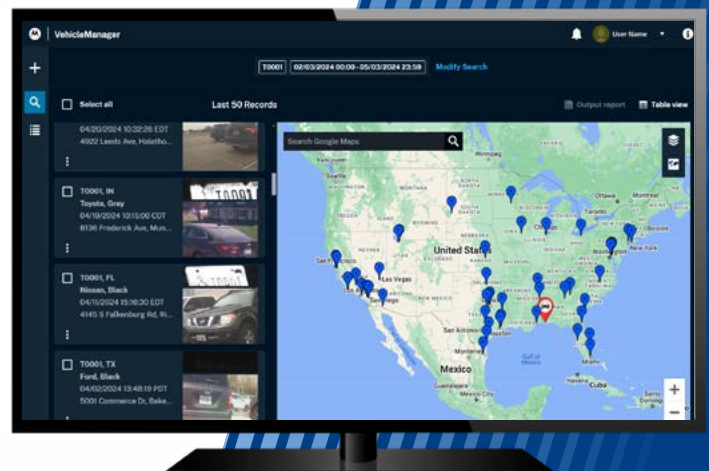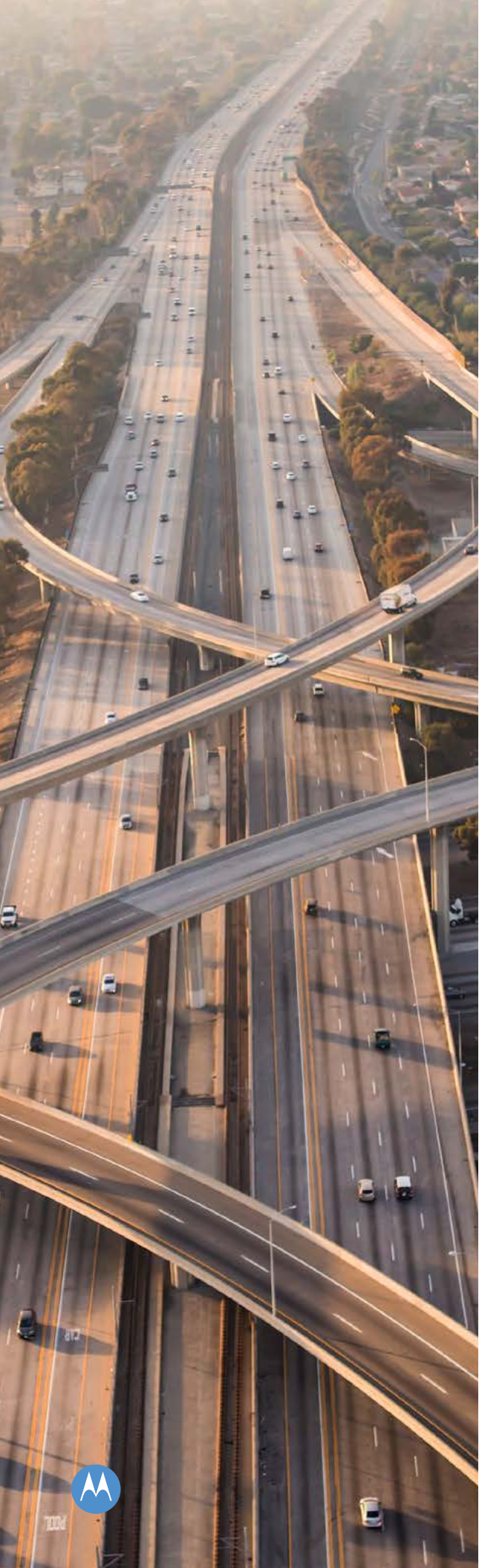
Policy, training and support

As well as quality product features and reliable functionality, sustaining a successful LPR program depends on proper policy creation, user training, vendor support and the easy access and integration of new innovations. A trusted vendor can be relied on to support these elements, in addition to technology development and ownership. In order to effectively support your LPR camera systems, as well as continuously push enhancements and innovations to your software, choose a vendor who's also responsible for the design and build of the technologies they sell you, including the software, algorithms and cameras - not a third party. Employing a third party can mean support is fragmented and meaningful innovation is stifled because customer feedback is unlikely to reach the actual developer of your LPR products.

Key services and functionality to consider

- Help with policy and process creation
- Free user and administrator training
- Direct 24/7 technical support
- In-house developed technology
- Free, automatic system updates

Procurement options

Upon determining the right solution for your agency, the final step is purchasing. A suitable vendor will be able to offer varying procurement needs, ranging from an upfront purchase, a subscription 'as-a-service' model, and financing options. Subscription pricing models can provide benefits like predictability of spend and automatic equipment upgrades, as well as including additional services such as warranty or advanced support. Before you commit to a subscription, ensure you're made aware of the required contract length.

Key procurement options to consider

- Outright, upfront purchase
- Subscription 'as-a-service'
- Required contract length

Selecting today's LPR systems:
One size does not fit all

Each type of LPR solution comes with its own questions and considerations based on projected use cases and overall program goals. An experienced vendor with law enforcement industry expertise will be able to match your specific needs to the right system, while ensuring your agency complies with rapidly evolving LPR regulations.

For over 90 years, Motorola Solutions has revolutionized law enforcement technology - creating innovative, mission-critical communications and security solutions that help agencies create safer communities. We hope the knowledge you've gained from this guide will instill confidence in your ability to acquire the best LPR system for your agency's unique needs, and with it, help your community thrive.

FOR MORE INFORMATION, CONTACT **ERS WIRELESS** AT 800-475-3320 OR INFO@ERSWIRELESS.COM

Get help with grants

Looking to make new LPR systems more attainable for your department? Motorola Solutions has partnered with the grant experts at PoliceGrantsHelp to offer you FREE customized help obtaining grants for LPR and other video systems for law enforcement. This includes grant research, grant alert notices and grant application reviews.

Whether you're just starting your project or need to add the final touches to an application, consultants can provide the grant resources you need to acquire LPR systems.

Start your grant search:
policegrantshelp.com/motorola-solutions-lpr-grant-assistance/

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