



# **ACTIONABLE INTELLIGENCE FOR SAFE CITY SOLUTIONS**

AI-Driven Image Recognition and  
Data Analytics Solutions



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A man is seated in a server room, looking at a computer monitor. The monitor displays a world map with network connections and a table of data. The room is filled with server racks in the background.

**WE ARE VIGILANT SOLUTIONS**



## IMPROVING EFFICIENCIES THROUGH TECHNOLOGY

With innovative intelligence solutions proven to help save lives, Vigilant Solutions provides enterprise national level intelligence systems and is a trusted technology provider to many agencies worldwide.

### A GREAT IDEA THAT GOT EVEN BETTER

A subsidiary of VaaS International Holdings, Inc., Vigilant Solutions originated from the race to produce advanced image recognition systems to support the microchip industry in the 1990s. Founder Shawn Smith recognized an opportunity to take this technological expertise and provide a system of tools built exclusively for law enforcement intelligence, personnel safety, crime and terrorism strategies, critical infrastructure monitoring and overall public safety.

In 2005, a team of 100 industry-leading experts under Smith's direction and

leadership developed and brought to market what has become the most comprehensive suite of image recognition, data and analytic tools found in the public safety sector.

Just as Vigilant was emerging as a leader in imaging systems and analytics for law enforcement and security, its sister company, Digital Recognition Network (DRN), was created in 2010 utilizing the same technology to fuel revenue, growth and streamlined work processes for top auto lending and insurance companies in the United States.

**At Vigilant Solutions, we help our clients identify, locate and apprehend security and safety threats. Our public safety infrastructure is driven by technology and data that delivers success across the globe.**

# INNOVATIVE SOLUTIONS

Data is cumbersome; intelligence is actionable. Data alone solves nothing. It is the computational analysis that reveals patterns, trends and associations.



## FIGHTING CRIME AND SAVING LIVES

Vigilant ingests, collects and analyzes image data using automatic number plate recognition (ANPR), facial recognition, ballistic image capture and comparison, and other image recognition, to deliver intelligence to agencies around the globe.

These analytics reveal criminal patterns, identify traffic trends and unveil associations that may otherwise go unnoticed for improved public safety, revenue recovery and efficient traffic management.

Data and analytics are securely collected and stored, conveniently accessible and easily understood.

No matter what type of intelligence is received, Vigilant is committed to protecting personnel, families and communities.

**Vigilant Solutions data fusion analytics enhance any agency's ability to identify, assess and share information, which can be directly related to a crime, terror threats, socioeconomic conditions and critical infrastructure.**

# WHAT WE DO

## PARTNERING WITH TECHNOLOGY

### Identify Persons of Interest

Either through ANPR, facial recognition, or ballistic image capture and analysis, Vigilant offers investigative solutions to assist in the identification of offenders of crimes that wear on a society and have negative economic and psychological effect on communities.

### Locate Persons of Interest

Once an offender is identified, Vigilant's ANPR offerings exponentially increase the odds of swift apprehension to mitigate further degradation of the community.

### Identify Associations of Persons of Interest

Being able to further identify additional actors and the locations they frequent further disrupts organized criminal enterprises from the continuous and corrosive effects on communities.

### Connecting Cases

Whether through ballistic comparison, facial recognition, ANPR technology or gun crime mapping, Vigilant allows law enforcement agencies to connect more cases and connect them quickly. This ultimately allows for future crimes to be interrupted and lives saved.

## COMBATING COMMON GLOBAL THREATS



DRUG TRAFFICKING



HUMAN TRAFFICKING



TERRORISM



ORGANIZED CRIME



PROPERTY CRIME

Vigilant is the premier global provider of automatic number plate recognition (ANPR) and facial recognition solutions to law enforcement agencies in the United States to provide secure environments.



# WHAT WE IMPACT

## SERIAL OFFENDERS



Focus can also be given to specific crimes, such as murder, sexual assault, major theft, burglary (breaking and entering), vehicle larceny, arson, kidnapping and robbery. Vigilant's ANPR tools can parse data to identify vehicles appearing in close proximity and within tight timelines of criminal events.

For example, a crime pattern with 10 related incidents: any vehicles appearing near events in two or more incidents should be investigated thoroughly to determine potential involvement, while any vehicle appearing in three or more becomes a more likely suspect.

## TRAFFICKING



Homeland security is significantly threatened by individuals participating in the trafficking of humans, narcotics, firearms/weapons and currency. In addition to the obvious degradation of communities, these highly organized criminal enterprises are often income generators for terroristic activities.

Vigilant's system can find anomalous vehicles and associated vehicles to generate leads for trafficking and counterterrorism investigations and create border-crossing hotlists of high threat vehicles.

## TERRORISM



Identifying associations similar to those of trafficking vehicles can further terror related cases. A separate HD camera can be synchronized with the ANPR camera so each record can be matched to show images of vehicle occupants — a critical piece of information.

Additional identity verification helps create associations between people in cases where a vehicle was used in a terror incident or other crime.

## ORGANIZED CRIME



Because organized crime groups are highly structured and revenue generating, they often need to cover large geographical areas, making vehicles a key asset for these groups to operate.

A comprehensive ANPR deployment in jurisdictions where these gangs commerce would be extremely valuable to an agency, municipality or nation. Additionally, ballistic image capture, analysis and subsequent correlation can connect cases where the same gun has been used in multiple incidents.





# IMAGE ANALYSIS: THE FUTURE IS NOW

# AUTOMATED NUMBER PLATE RECOGNITION (ANPR)

Vigilant Solutions makes technological advances both accessible and easy to consume through the use of patented cameras, both fixed and mobile, and specialized software to create viable leads.

## AN INTEGRAL PART OF HOMELAND AND COMMUNITY SAFETY

Primarily used by government agencies, ANPR technology has been around for more than 30 years. First employed by U.S. Customs and Border Protection (CBP) at border crossings, law enforcement agencies worldwide now use ANPR to aid in activities, such as finding vehicles that have been stolen, used as getaway cars, or served as an accessory to other crimes.

### How is ANPR information Gathered?


ANPR technology involves infrared cameras — either stationary or mobile — that photograph number plates; timestamp the images with the date, time and location coordinates; and store the information in searchable databases for investigative use.

### What information does ANPR provide?

An ANPR record consists of images of the number plate and vehicle, along with the system's interpretation of the number plate characters using optical character recognition (OCR), time and date stamp, location coordinates and other system-generated information for auditing purposes.

### How is the data used?

According to a 2018 PoliceOne survey conducted in the United States, ANPR is mostly used for fugitive apprehension, followed closely by theft, burglary and murder investigations. In the private sector, ANPR technology is being utilized to protect critical infrastructure, detect insurance fraud and recover financed assets.



**As police are patrolling the streets, ANPR systems are continually scanning number plates and alerting them of any plate photographs matching records in law enforcement databases that are connected with a crime, or person of interest.**

# FACIAL RECOGNITION

Facial recognition has improved in both accuracy and overall ease-of-use in recent years providing a powerful tool for access control, investigations, alerting against persons of interest, and proof of life.



## Access control

Optimal images for facial recognition matching are those captured in a controlled environment. This occurs with good lighting, frontal face positioning, high resolution and acceptable distance from the camera. These are ideal scenarios for access control at airports, government facilities, corporate buildings or any other facility, eliminating the need for a badge or other forms of identification. Facial recognition provides effortless entry without sacrificing security. Other technologies, such as ANPR, can be combined with facial recognition to offer dual authentication access.

## Continuous monitoring

Catalogue faces by deploying facial recognition cameras, such as CCTV, at events or major sporting venues.. Each face is compared against the lists of potential bad actors. If any matches are made, a notification is sent so action can be taken enabling law enforcement personnel to be more proactive.

## Investigations

In the course of an investigation, the greatest challenge is the fact that most probe images, images captured as part

of the criminal event, are obtained but are uncontrolled in nature. They often originate from off-axis CCTV camera feeds, low-quality ATM cameras, social media images and other sources where the image is less than ideal for facial recognition. In order to overcome these limitations, image enhancement is required. Possible matches obtained following image enhancements are considered investigative leads and do not identify a person in this instance.

## Image quality is key

The success of facial recognition software relies heavily on the quality of equipment and/or user skill to capture the image. Video surveillance systems often have very little tolerance for changes in light or facial expressions, and lack facial images captured from multiple angles. Many cameras also capture images at a very low resolution, making identification for analysts using these systems very difficult. Controlled images are those with good lighting, frontal face positioning, high resolution, and acceptable distance from camera — for example, those taken by personnel in the field, at a kiosk station, or an identification card photo.



MONITOR  
SECURE LOCATIONS



IDENTIFY PERSONS OF INTEREST  
AND THEIR ASSOCIATES



PROVIDE ACCESS CONTROL  
AT SECURE LOCATIONS

# FORENSIC BALLISTIC IMAGE CAPTURE AND ANALYSIS

Just like a suspect, a gun has fingerprints. When fired, a gun leaves dents, pings, and grooves on an ejected cartridge case. Firearms examiners say these marks are like fingerprints in that they are unique to the gun that produced them.

## **People, Process and Technology**

For several decades, computerized imaging technology has been used to assist law enforcement in finding potential links between images of ballistics evidence gathered from crime scene investigations, namely, cartridge cases and bullets from fired guns. Comparison of this ballistic evidence has been used to link crime incidents to other crime investigations, to link specific pieces of evidence to each other and to particular weapons. This technology has great potential to generate critical investigative leads to possibly related incidents both at the local level and across broad geographic areas. Unquestionably, ballistics evidence matching assists police investigations of crimes involving firearms, thereby increasing the chance of arrest, conviction, and punishment of criminals.

## **Comprehensive Collection Leads to Connections**

Until only recently, there were limited solutions available to public safety. These solutions were

costly, therefore leaving large numbers of law enforcement agencies with limited access. As a result, many agencies have failed to embrace a comprehensive collection policy, where ballistic evidence is recovered and analyzed in all cases, not just ones where injuries or fatalities occur. So, the need for a scalable, affordable and rapid ballistic analysis tool arose. And that is when Vigilant Solutions capitalized on its core capability of image recognition and analysis and developed BallisticSearch™. Due to its fast upload, processing and analytical capabilities, BallisticSearch can generate leads in a matter of minutes versus days, weeks, months and in some cases years. At a time when violent crime is on the rise and projected to continue, minutes are crucial in an investigation. Vigilant is committed to ensuring that BallisticSearch will deliver results and the investigative leads required by agencies to make communities and officers safer, close cases faster and reduce crime rates.

**The firing pin of each firearm leaves a distinct impression that is unique to the firearm. Vigilant uses software to carefully compare and identify cartridge casings to a firearm or another cartridge casing. These connections help develop new investigative leads.**





**STAY VIGILANT**

# PERSONNEL SAFETY

## PARTNERING WITH TECHNOLOGY

### Information/intelligence:

Tactical teams should always run queries and gather information before responding to the scene, which can help predetermine apprehension strategies when necessary. More information and preparedness means safer activities.











### Situational awareness:

There are always potential threats nearby in any situation, including vehicles or individuals, and information overload is always a possibility. Officers may not be able to hear or

discern critical information from the surrounding chaos, or have time to process it. Quick and easily digestible information assessing an officer's surroundings is critical.

### Field identity validation:

The longer it takes to identify a subject being questioned in the field, the higher the risk of assault and injury to an officer. Facial recognition in the field is a proven method of keeping officers safe and making correct decisions on detainment.

 FIXED ANPR	 PATROL ANPR	 MOBILE APPLICATIONS	 SMART DEVICE DATA COLLECTION	 PARKING ENFORCEMENT
 FACIAL RECOGNITION	 BALLISTIC RECOGNITION	 DATA FUSION	 GUN CRIME MAPPING	 BODY WORN CAMERA TECHNOLOGY

The safety of personnel responding to a situation and the citizens in the surrounding area are paramount. Having the most relevant information as quickly as possible — both prior to and after arriving on the scene — increases the probability of a positive outcome.

Vigilant gives you the tools you need.

## REDUCED CRIME RATES

Early identifications lead to early apprehensions which lead to future terror or criminal incidents not committed.

### **Virtual Fence:**

By strategically placing CCTV and ANPR cameras around geographical areas or designated campuses, such as colleges, schools and commercial parks, a “ring of steel” is established. This generally becomes known, often displacing criminal activity. In the low likelihood an actual crime is committed within the “ring of steel,” evidence or leads will be generated to assist in the swift identification and apprehension of the offender.

### **Recidivism:**

A recidivist is one who relapses into a previous behavior or condition, a habitual criminal. Vigilant Solutions can help identify recidivists — early identification of habitual offenders leads to early apprehensions, resulting in future crimes not committed.

80 percent of respondents indicated that LPR data had assisted in providing leads and closing cases for a wide variety of crimes, including:

43%

MURDER

41%

DRUG TRAFFICKING

27%

SEX CRIMES

# INCREASED PRODUCTIVITY AND CONNECTING CASES


## WHO, WHAT, WHEN AND WHERE

### **Vehicle Location Intelligence:**

Vigilant's powerful analytic tools continue to generate leads through the location analysis feature, which clusters plate detections and provides agencies with specific information on a vehicle of interest, including its most popular sighting location, most recent sighting location, and least popular sighting location. Actionable intelligence tells agency personnel a factual story by providing the best locations to find a vehicle, eliminating least likely locations, and informing agencies of specific dates and times these vehicles have been seen. This powerful historic and predictive analysis allows for the

effective and efficient deployment of personnel to locate these vehicles of interest and take appropriate action.

**Vehicle Associations:** The association analysis feature establishes links and relationships between vehicles of interest since many criminal organizations, gangs, and larceny groups travel in caravans. Associate vehicles are always a factor in investigations because the individuals driving associate vehicles often act as lookouts, transporters, decoys, or scouts. It is also a certainty that many caravans of vehicles traveling together can also be identified as major contributors to traffic congestion.



**Vigilant's ANPR deployment is a major advantage for any municipality to quickly locate vehicles of interest and identify traffic offenders. Data fusion analytics make this process easy, scanning millions of plates in only a few minutes, allowing users to search and filter by year, make, model and color.**



## DATA



When fugitives—or even individuals involved who will not be charged—are avoiding authorities, a real-world solution is needed. There are vast quantities of data available linking individuals to a certain location or ownership of property. But, do you know if they are ever at that property? Do you know when? Do you know where else they might be? Vigilant Solutions connects the dots.

- If an investigator can link a person to a vehicle and obtain that vehicle number plate, there is a significantly higher chance of locating that vehicle and therefore, that person.
- Historical detections can reveal past locations frequented by an individual, and future detections can tell you where the person has fled.
- Those key components combined with an alerting mechanism give investigators an edge to solve cases more quickly.

## HOTLIST VEHICLE ALERTS



When a vehicle is identified as “wanted,” “known,” or “banned,” the system will issue an alert so the next time the vehicle plate is captured on a roadway, the agency will receive notifications allowing it to take appropriate measures. These alerts are also utilized to assist in locating lost or abducted children, missing senior citizens or anyone who may be operating a vehicle incoherently and needs to be located as soon as possible. Real-time notifications provide agencies with actionable intelligence so that the most strategically deployed officers can be dispatched to intercept the wanted vehicle in any location. The process will repeat itself with each fixed camera capture until the wanted vehicle is finally located. This systematic method of capture provides agencies with very high success rates and can aid numerous investigations.

## HISTORICAL DETECTIONS ON TARGET VEHICLES



Reviewing historical detections of vehicles and who was operating the subject vehicle at certain times, can offer insights into activities of persons of interest. Placing persons of interest at specific locations can either provide evidence of crimes—or offer alibis. Fugitives who have fled in the past are likely to go where they feel most comfortable and where they can obtain resources to remain at large. Analyzing days of the week and times during the day can provide precise efforts toward a location rather than spending countless man-hours on surveillance.

## GENERATING INVESTIGATIVE LEADS



Vigilant’s ANPR deployment is a major advantage for any municipality to quickly locate vehicles of interest and identify traffic offenders. Data fusion analytics make this process easy, scanning millions of plates in only a few minutes and allowing users to search and filter by year, make, model and color. Additionally, Vigilant’s facial recognition and ballistic image capture, analysis and correlation tools help investigators develop existing leads and uncover new ones.

# REVENUE DISCOVERY AND RECOVERY

Revenue recovery can help boost depleted economies by providing alternate funding options for a variety of programs and infrastructure needs such as traffic congestion and road repairs.

## USING DATA TO RECOVER REVENUE

**Drug Interdiction:** Transporting narcotics and cash is the lifeline of the drug trade and vehicles are the most efficient way to transport contraband due to the low risk of identification. ANPR is a common and very effective tactic to utilize in drug interdiction activities, especially on major thoroughfares and arteries connecting large cities. An effective ANPR strategy will yield high quantity seizures of contraband in the form of product and cash.

**Forfeiture & Recovery:** Any assets obtained or derived from criminal activities could be subject to seizure by the state, including vehicles. This applies, but is not limited, to terrorist activities, drug related crimes, and other criminal and even civil offenses. ANPR is also effective in locating assets for the eventual seizure of said property.

**Traffic and Parking Issues:** Agencies and municipalities can efficiently locate offenders while gathering vehicle location data, creating hotlists of offender vehicles and receiving instant alerts when the offender's plates are scanned by any ANPR system.

A major metropolitan city in the United States has a list of more than 5,600 unpaid parking offenders per day; each with more than four outstanding parking summons totaling approximately \$1,000 each with penalties and interest would be valued at more than \$2.8M annually. A deployment of mobile ANPR cameras helps to identify these offenders and recover revenue.

**Data insights help analysts locate elusive vehicle operators in many communities throughout the United States and abroad to quickly recover unpaid fines, which greatly assists in reducing deficits.**

# REVENUE DISCOVERY AND RECOVERY

Vigilant makes it easier to collect on outstanding fines, including the ability to collect fees on the spot.

## COLLECT OUTSTANDING MUNICIPAL DEBT

**On-the-Spot Collection:** As an added value, agencies can access a fully integrated web-based credit card payment-processing portal. When an agency receives an alert, an officer can:

- Stop a motorist
- Verify the driver's identity
- Collect an outstanding debt on the scene or arrange for payment alternatives

**Collections Portal:** Vigilant's web portal offers a full online payment option and gives authorized government agencies access to all paid transactions. All Vigilant clients using the system can:

- Have options to view any transaction processed by an officer in the field
- Produce automated payment progress reports

### Information is Always Updated:

The value for an agency using the debt collection system is indicated by an increase in:

- Locating individuals with outstanding tickets or other fines
- Revenue recovery
- Respondents who would have eluded payment before

Vigilant data fusion of public records also ensures positive revenue recovery by verifying the most current offender information is in the system by collecting from driver's license, vehicle registration and national ID card databases.

**With the widespread deployments of revenue recovery technology,** many law enforcement agencies now issue lower level citations or fines when a number plate is identified as expired. This methodology can be applied in the Philippines, for example, where routine monitoring of delinquencies allows for quicker revenue recovery of unpaid

fines resulting from expired number plates, other parking infractions, number coding violations and a crackdown on expired or counterfeit friendship route stickers, a highly sought after permit allowing drivers to bypass heavily congested roadways by taking routes through private villages and subdivisions.

# REVENUE GENERATION USING ANPR

It is not uncommon for a minority of vehicle operators to occupy a large fraction of road use. A study within Los Angeles determined that about 2% of vehicle operators were contributing to about 20% of road traffic along certain urban roads. If money paid for road use is limited to the highest users, the political impact is likely limited as well.

## USING DATA TO RECOVER REVENUE

### **Toll collection and enforcement:**

Vigilant's ANPR technology can also be used for charging tolls and enforcement.

- Electronic toll collection on pay-per-use roads can be monitored
- Violations for non-payment can be enforced
- Movements and patterns of vehicles in traffic can be catalogued and time stamped for later retrieval by any authorized agency

**Congestion charging:** Congestion charging is a system of surcharging users of public roads in heavily congested urban areas.

- Congestion charging on urban roads has been successful in London, Singapore, Milan, Stockholm, and the Czech Republic
- Implementation of congestion pricing and enforcement through Vigilant ANPR deployments has reduced congestion in many urban areas
- Most economists agree that some form of road pricing drastically reduces congestion and is economically viable.

In nations where the public use of credit cards or other electronic

payments is limited, it is beneficial to create a tiered structure of road use — “normal” and “above normal” — whereby members of the public who have above normal use of roads in congested areas pay an annual surcharge added to their annual vehicle registration fees.

Vigilant can assist global clients in the design and implementation of a congestion pricing plan, which helps to fund the national security aspect of a largely scaled national ANPR project.

### **General applications where congestion charging may be used:**

Congestion charging is a system of surcharging users of public roads in heavily congested urban areas.

- Cordoned areas around city centers — a charge is imposed for passing a cordon line
- Areawide congestion pricing — a charge is imposed for driving inside the designated area
- City center toll rings — toll collection around a city
- Corridor or single facility congestion pricing — a charge is levied for access to a lane or facility



# IMPROVING TRAFFIC CONDITIONS

## ELEVATE TRAFFIC CONDITIONS USING ANPR

Vigilant helps agencies monitor general traffic flow patterns and locate the travel direction of specific vehicles around any road network. With combinations of fixed and mobile ANPR technology deployments, it's also possible to monitor and highlight problematic road conditions as they occur. These analytical insights keep transportation officials informed to make better incident management decisions.

**Cameras perform double duty:** Vigilant's data and analytic product line can work with existing cameras, including CCTV, currently deployed throughout any infrastructure. Any camera, which is open network video interface forum (ONVIF) compliant, can be utilized for number plate recognition using optical character recognition. These units, deployed along with fixed and mobile Vigilant cameras at strategic locations can immediately help agencies:

- Calculate the speed of a targeted vehicle for speed enforcement
- Identify anomalous vehicles recognized through abnormal travel behavior and patterns
- Store the color of the vehicle within the database for post incident investigations to identify first time and repeat traffic offenders

- Deter vehicle operators from unlawful behavior

**Congestion relief:** Strategic placement of Vigilant's patented fixed ANPR cameras deployed throughout municipalities assist in the reduction of traffic, provide a robust sets of analytic data, and allow any municipality more intelligence for investigations such as:

- Form better travel management policies by analyzing peak travel times along heavier congested roadways
- Quantify travel times to make improvements in congested areas
- Analyze traffic patterns when incidents occur to provide the public alternate routes
- Identify infrastructure problem areas to make timely improvements

**Lower emissions:** Reduced congestion also means lower emissions. Sitting in traffic is becoming a global issue as more and more vehicles pour onto roads. Transportation officials recognize the need for safer commuting and are constantly challenged to meet carbon footprint reduction goals. An intelligent traffic system with deployed ANPR cameras can help.



# CAMPUS SAFETY SOLUTIONS

## VIGILANTCAMPUS™

VigilantCampus™ is the premiere early-warning alert system providing law enforcement and campus security officials with an additional three to five minutes to respond, investigate and disrupt or prevent a potential critical incident. Using both PlateSearch and FaceAlert technologies in one platform, VigilantCampus can detect both vehicles and potential threat actors before they make their way into a campus building. Identify vehicles in the outer and middle perimeters based on watchlists created by the campus, then use those watchlists to help confirm their presence in the inner perimeter of your campus. Campus security officials develop the watchlist from known threats and may choose to then supplement it with tens of millions of mug shots and photos of sex offenders from Vigilant's image gallery.



#### **ALERT KEY STAFF**

in real-time via desktop or mobile phone app.



#### **SECURE**

the perimeters.



#### **COLLABORATE**

with law enforcement.



#### **IMPROVE**

#### **CAMPUS MORALE**

with safety measures.





# INNOVATIVE TECHNOLOGY



## PIONEERING HARDWARE

There are many ways to utilize Vigilant Solution's patented technology and equipment including ANPR fixed and mobile, as well as closed circuit systems. Vigilant equips you to fight — and even prevent — crime on a local or national scale.

### ANPR FIXED

Fixed ANPR deployments from Vigilant are ideal for strategic monitoring and data collection along roadways, bridges, tunnels, key road junctions, entrances to buildings, or critical infrastructure.

- The only smart ANPR camera in the world powered by an on-board Linux computer within a NEMA6 class camera housing
- Instantaneous data to the analytic software
- The only ANPR system using two camera sensors to analyze both infrared (IR) and color cameras at the same time while reading number plate attributes

### ANPR MOBILE

Mobility provides flexibility, and mobile ANPR includes smaller cameras mounted on vehicles with the ability to read number plates at higher speeds — up to 100 mph — with smaller more durable processors able to withstand physical shock environments.

- Plate capture is simple and intuitive
- Field personnel can photograph a license plate and add it as a vehicle of interest to be stored in the ANPR network
- ANPR mobile can match plate captures against agency hotlists and query historical data
- Users can scan any plate using their mobile device and receive instant feedback to enhance situational awareness
- Match any hotlist vehicle plate with historic plate captures to locate "hits" nearby
- Alerts may be sent to email addresses, the smartphone application, or PC attributes



# VIDEO TECHNOLOGY

Combinations of public and private CCTV schemas deployed can work together in public areas to monitor and detect incidents and help agencies to coordinate police responses. With these systems in place, various facets of Vigilant's facial recognition technology can be utilized and have impact on any number of activities.

## HIGH RISK OFFENDER MONITORING:



Local police create 'watch lists' of higher level offenders wanted for arrest, or those who are considered likely to commit crimes again (recidivism). The personal data of these individuals already exists in a database in the form of a mug shot or booking image along with a criminal history, with the metadata behind each image or "face" enrolled into a master gallery. This gallery of information is intelligence needed to validate any match results in a facial recognition investigation. Once an image capture is made from a camera, an operator, analyst, or police official verifies the facial matches made by the software, verifies the image matches for accuracy and looks for any false alarms. This strategy is an effective way to deter violent or other serious crimes and lead to the apprehension of unknown individuals.

## LOWER LEVEL STREET CRIME MONITORING:



Many cities worldwide are known for a high propensity of bag snatchers, pickpockets and con artists. Age often is not a factor as children and the elderly also play active roles as decoys in these crimes. These incidents have higher probabilities of occurring in bar districts and popular tourist spots. A deployment of cameras can eliminate the need to create a specialized task force to monitor these locations. Instead, patrol officers in these districts can utilize the facial recognition technology via a mobile app to quickly capture a photo of a suspicious person on their mobile device and immediately identify them through a facial recognition match. Field validation of unknown suspects is critical to personnel safety and will keep crime rates low allowing economies to flourish with more tourism.

## COUNTERTERRORISM STRATEGY:



The goal is to put "a name to a face." To achieve this, governments can create a national photo database of residents who legally reside in the country. The database will consist of all photographs received in the form of government records including those found on passports and driver's licenses. When an image or face is searched against the nationwide gallery of known residents, enforcement officials can use facial recognition capabilities to instantaneously identify any of the following:

- Known terror suspects
- Illegal aliens
- Individuals wanted for crimes

## SENSITIVE LOCATION DEPLOYMENTS:



Military installations and other sensitive or strategic areas can be closely monitored, including government buildings, border regions, military camps, bridges, airports, naval dockyards and houses of worship, among others. Anyone seen acting suspiciously or simply taking photographs at these sensitive locations can immediately be identified as lower level security risks, or a high-level threat, allowing for appropriate action to be taken including warnings, fines, or arrest and imprisonment.

## NATIONAL BORDER CONTROL INITIATIVE:



Border security can collect and analyze large amounts of data with target analysis of this data used to combat both narcotics and human trafficking. This initiative can combine various facial recognition offerings, fixed and mobile ANPR cameras, as well as body cameras.



# CUTTING EDGE SOFTWARE

# VEHICLE LOCATION DATA & ANALYTICS

## ANPR LEARN® OVERVIEW

LEARN is Vigilant's enterprise class investigative data platform providing law enforcement and government agencies access to ANPR records and analytics. In addition to receiving alerts for vehicles on the hotlist, Vigilant's platform allows personnel to search historical ANPR detections, identify the best location for a vehicle, stakeout an address virtually and share data amongst other agencies. The web-based solution reduces the IT burden and provides infinite scalability and data security. LEARN's vehicle location intelligence extends the power of any agency to develop more investigative leads and close cases faster.

Featuring automatic number plate recognition reader (ANPR) management and an analytic platform of unmatched capabilities, LEARN provides agencies an easy way to:

- Use advanced analytics for enhanced investigations
- Query historical ANPR data
- Create and manage hotlists
- Manage users
- Share data and provide interoperability with other law enforcement agencies

### Special Features – Alerts and Analytics:

- **Target Alert Service** — providing agencies with alerting capabilities from LEARN to almost any device
- **Mapping Alert Service** — matching agency hotlists with an ANPR database to provide additional hits
- **Stakeout** — A location-based search of vehicles with an ability to filter by date and time
- **Locate Analysis** — A Vigilant-exclusive analytic tool presenting a new way to look at historical data by providing actionable intelligence on the most likely — and least likely — location(s) to locate a suspect vehicle and a statistical analysis of the detections
- **Standard reports and dashboards** — to provide easy visibility on usage statistics, system health, and results; and scheduled automated reports for command staff and ANPR program managers

Featuring a robust software platform, Vigilant Solutions provides the most thorough and user friendly analytics in the industry, from ANPR and facial recognition programs and mobile applications to in-car display packages.



# PLATE DETECTION SOFTWARE

## ANPR LEARN® OVERVIEW

### Car detector mobile systems

With the user's needs in mind, the Vigilant Mobile ANPR system provides a simple user interface to access unparalleled functionality and advanced capabilities not available elsewhere. Managed from within LEARN, Vigilant's Mobile ANPR is the most advanced system available, featuring:

- Up to four (4) dual-lens ANPR cameras Integrated Digital Signature Processors (DSP)
- Advanced imaging and recognition algorithms providing the most advanced mobile ANPR system available

### Special Features – Alerts and Analytics:

As a key component to any successful ANPR program, Fixed ANPR from Vigilant provides:

- Strategic monitoring and high volume data gathering around a city, region or critical infrastructure location
- Alerts via LEARN® to email addresses, the Mobile Companion smartphone application, or the Target Alert Service client application for PCs

## AUTOMATIC NUMBER PLATE RECOGNITION

### EXISTING DATA

Toll Roads  
CCTV

### VIGILANT DATA


Fixed ANPR  
Patrol Car ANPR



### ALERTS ON HOTLIST VEHICLES

### ANALYTICS FOR INVESTIGATIONS





**Vigilant Solutions distinguishes itself from all other facial recognition offerings on the market today providing agencies with actionable intelligence and a valuable source to help close cases effectively and efficiently.**

## **FACIAL RECOGNITION**

The FaceSearch™, FaceAlert™, Mobile Companion™, and Proof of Life facial recognition technologies help to greatly reduce investigation times, and enable investigators to quickly identify, or rule out, suspects after a crime has been committed.

### **CUTTING EDGE TECHNOLOGY**

Whether monitoring public gatherings with CCTV or using an image captured from a criminal event, facial recognition can maximize law enforcement efforts by alerting of potential bad actors and delivering investigative leads.

**Proof of Life:** Vigilant Solutions constantly seeks to improve upon any technology vulnerabilities it identifies and has addressed “spoofing” of facial recognition systems.

“Liveness” face detection uses multi-modal biometric technologies to confirm that a face belongs to an actual living being, as opposed to a face in a photo or video.

## HOW DOES "PROOF OF LIFE" FACE DETECTION WORK?

1. Movements are measured through randomized prompts and each command is then verified in the system.

2. This active facial analysis requires the user to follow a series of unpredictable face position commands set by the system administrator. These unpredictable commands make it difficult to rely

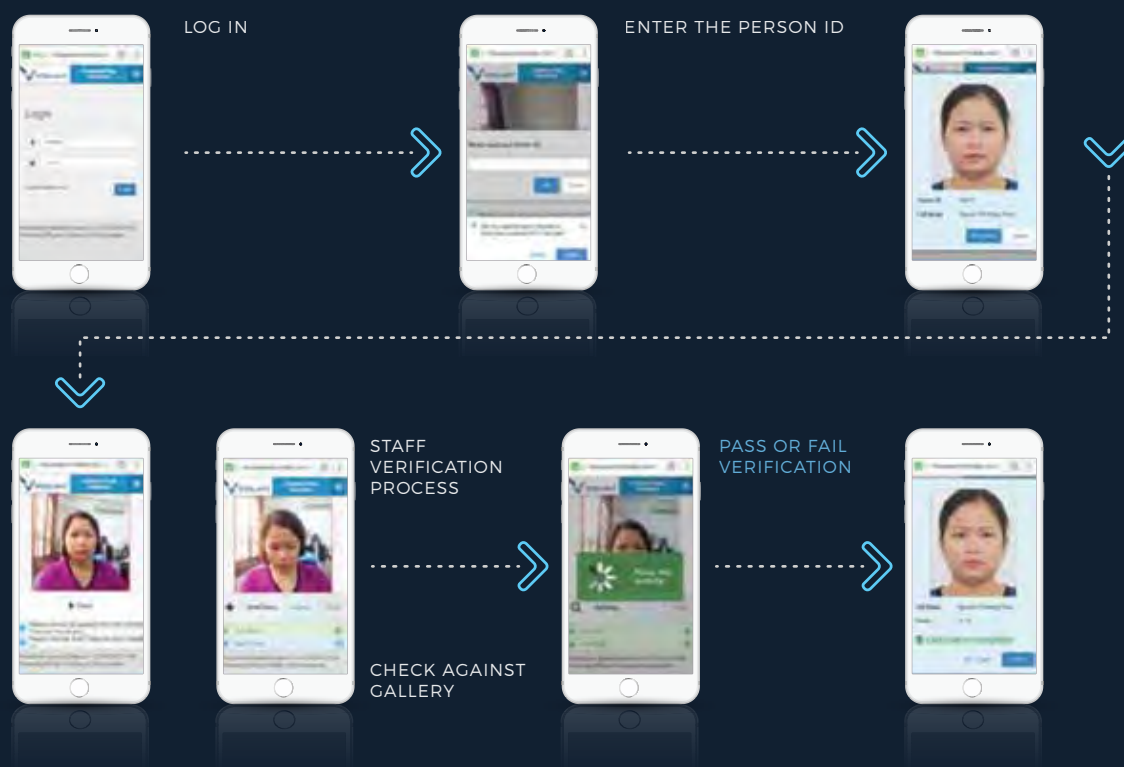
on canned photos or videos to spoof facial recognition technology.

3. When a user does not comply with one prompt, the application generates a failed identity check.

4. When a user follows all the random and unpredictable face command prompts correctly, the

"proof of life" validation process has ended.

5. Secondary facial recognition verification then begins using FaceSearch technology to compare the user against the stored profile image contained in the database.



**Vigilant Solutions distinguishes itself from all other facial recognition offerings on the market today by providing agencies with actionable intelligence and a valuable source to help close cases effectively and efficiently.**

# FACIAL RECOGNITION OPTIONS

Vigilant can use various methods to provide partners with valuable facial recognition database content—criminal and high threat individuals, including but not limited to convicted felons, registered sex offenders and known terrorists.

## ■ FACESEARCH™

Agencies worldwide turn to Vigilant's advanced facial recognition software to develop leads and solve crimes. Built by end users, FaceSearch is easy-to-use in the course of investigations.

- Embedded image enhancement tools to run poor quality images through facial recognition
- Analyzes more than 350 facial vectors
- Web-based application available on mobile devices
- Easy to import images and build gallery

## ■ FACEALERT™

Used by many law enforcement and security professionals around the world, Vigilant's FaceAlert system analyzes video, captures and catalogues faces and compares the captured faces with image galleries of known persons.

Compatible with a wide range of IP video cameras, either through direct interface, or via SDK to provide an added layer of security and intelligence, FaceAlert:

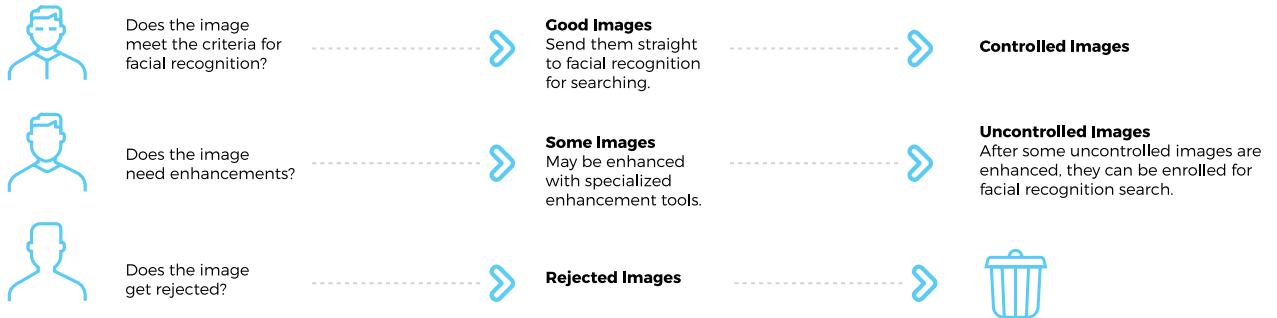
- Leverages existing infrastructures and is used to secure sensitive areas such as airports, banking facilities, government locations, and other sensitive locations
- Captures and tags faces with date, time and location
- Searches watch lists comparing against multiple galleries
- Triggers an alert when a person is identified

**Recognizing that the types of images received during criminal investigations are often less than perfect, including poor quality probe images, Vigilant developed breakthrough image pre-processing tools. The easy-to-use interface gives agencies the ability to enhance images prior to search, thereby creating more opportunities to generate investigative leads.**

# FACIAL RECOGNITION INVESTIGATIVE WORKFLOW

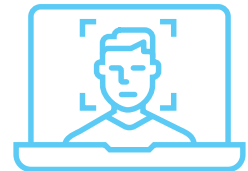
## STEP 1 IDENTIFY THE IMAGE

A **FACE EXAMINER** needs to ask the following when vetting images for quality:



## STEP 2 RUN THE SEARCH

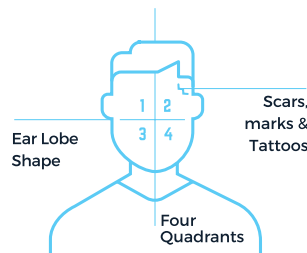
**APPLY DATA FILTERS TO YOUR SEARCH** to narrow the returned list to levels of specificity for higher accuracy rates.



## STEP 3 FACIAL IDENTIFICATION

### FACIAL ANALYSIS

When additional profile images become available, utilize them for a comparative analysis. Ear lobe shapes and patterns can validate or dismiss your candidate as a potential match.



Definitive markings found by the analyst make possible match candidates stronger choices during the subjective facial analysis.

**Note:** Lower quality probe images return matches deeper in your candidate list. Expand the list to return 250-500 candidates.



Candidate Expand List

## STEP 4 VERIFY YOUR CHOICE

### FIRST LEVEL VERIFICATION

If physical characteristics have been met and a possible match candidate is selected from the gallery, conduct an immediate background investigation.



**Check Incarceration Status**



**Check Addresses (Residence vs. Proximity to the Crime)**

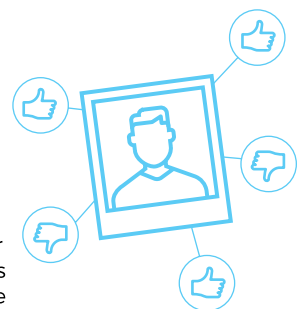


**Check Modus Operandi and Prior Arrest History**

### SECOND-LEVEL VERIFICATION

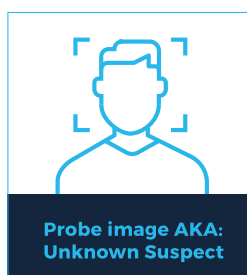
Present your case for peer review. Show that all physical similarities and background check validations are complete.

Pitch your match to 3 to 5 peers for validation. Discuss any other factors which make this candidate a viable choice as a possible match in the facial recognition investigation.



## STEP 5 THE POSSIBLE MATCH

### THE INVESTIGATIVE LEAD



**FACIAL RECOGNITION SEARCH RESULTS ARE INVESTIGATIVE LEADS ONLY. DO NOT MAKE AN ARREST BASED ON A POSSIBLE MATCH REPORT.**



Do not verify a person's identity based solely on possible match results.



Use other standard law enforcement procedures to verify a person's identity



# MOBILE APPLICATIONS

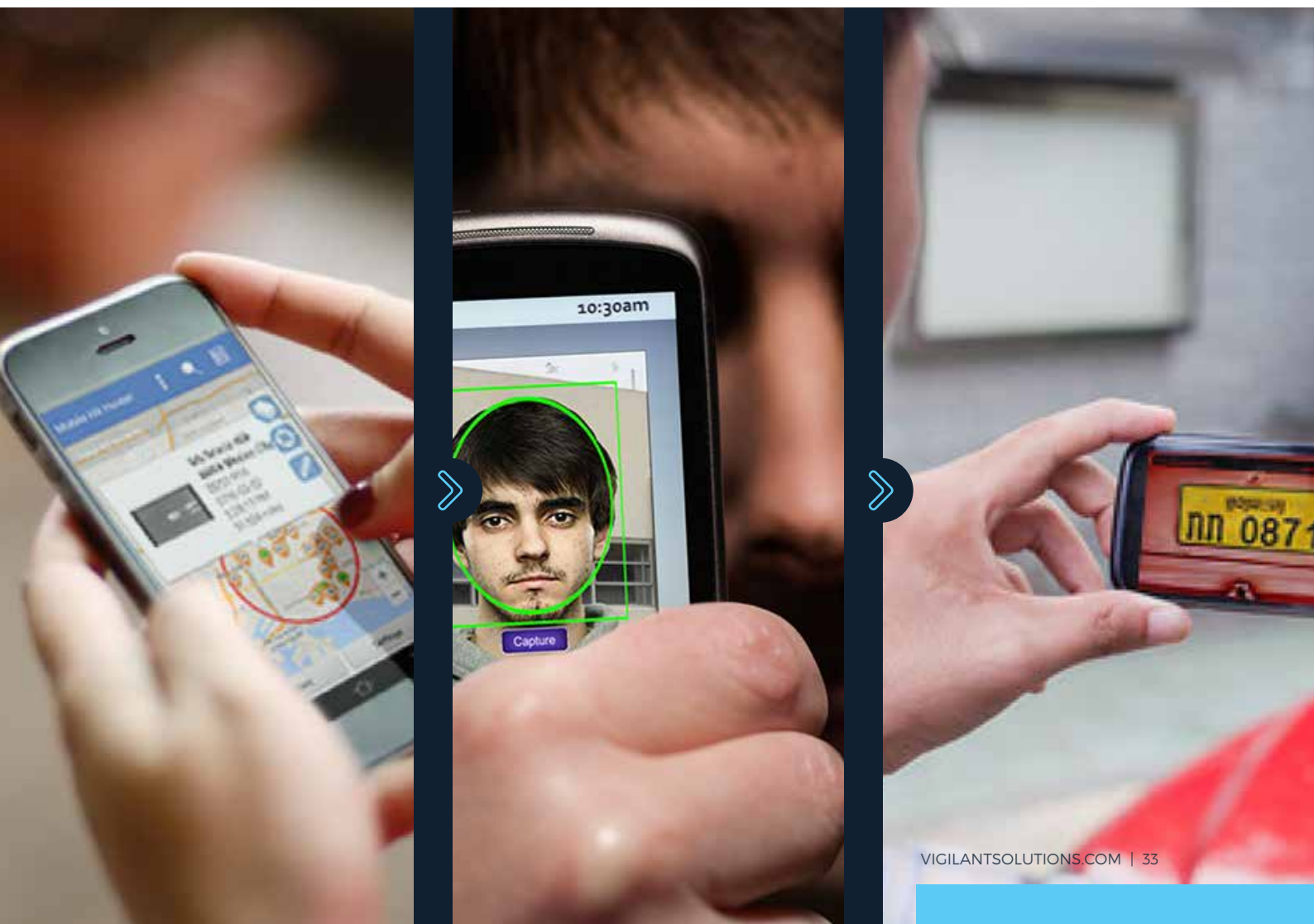
Many agencies find Mobile Companion™ extremely useful in identifying target vehicles in high traffic areas and capturing instant plate data through a handheld analytic device or in-car software.

## MOBILE COMPANION™

This industry-exclusive mobile app delivers the same benefits as Vigilant's ANPR and facial recognition technologies, allowing law enforcement agencies to conveniently take ANPR and facial recognition into the field using a mobile device.

Mobile Companion enables officers on patrol, or in the field to:

- Conduct searches of known number plates
- Scan plates and receive alerts
- Create and manage hotlists of vehicles of interest
- Capture faces for matching against a gallery of images
- Conduct vehicle canvasses and send case details back to the office



# BODY WORN CAMERA TECHNOLOGY

Body worn camera footage is a necessity for nearly any organization's public-facing representatives today; hold all parties accountable and share exactly what happens as a situation unfolds. Whereas a bystander's cell phone footage only tells part of the story, the body worn camera is an objective tool that shows what professionals in a wide variety of industries see when they come onto a scene, as well as captures their actions and reactions.

## ■ VIDEOBADGE™

High-quality, reliable footage of incidents is essential to protecting personnel, promoting transparency with the public, ensuring best practices and offering tamper-proof evidence to secure convictions. VideoBadge body worn cameras are used around the world by law enforcement, security teams and public-facing representatives in many industries because the technology is user-friendly, secure, lightweight and able to work with a user under any conditions.

Industries where VideoBadge adds value:

- Law enforcement
- Airline/airport security
- Corporate security
- Hospitality services
- Repossession services
- Parking enforcement

- Rail/transportation services
- Healthcare/eldercare services
- Road safety services
- Fire services
- Manufacturing
- Cash-in-transit
- Port/Harbor security
- Compound guarding
- Gated communities

## ■ WHAT VIDEOBADGE CAN DO FOR YOU

Developed by law enforcement experts, Wi-Fi enabled VideoBadge is third-generation body worn camera technology designed to provide unrivalled footage of ongoing incidents. Experience a 130-degree horizontal field of view with day and night HD recording capability in any weather, integrated pre-record functions and RFID touch-assignment. Record up to 14 hours of footage and download in minutes for analysis.

## ■ WHY YOU WANT YOUR BODY CAMERA TO BE VIGILANT



### ➤ Proven and Trusted:

Law enforcement, security personnel and representatives in other public-facing industries across the globe have relied on VideoBadge for more than 10 years.



### ➤ Storage in the Cloud:

VideoBadge images are stored in the Vigilant Solutions' cloud and seamlessly integrates with Vigilant's investigative platform.



➤ **Dedicated to AI Innovation:** Since 2009, Vigilant Solutions has set the standard for innovation in AI and machine learning for automated license plate recognition, facial recognition, ballistics analytics and firearms mapping technologies. You can be sure we will continue to innovate with body worn cameras.

## FUNCTIONAL AND NON-INTRUSIVE TO USERS

With the touch of an easy-to-locate button, record the incident in high definition up to 1280 x 720 pixels as it happens, regardless of the time of day or night or the weather conditions VideoBadge devices are small and lightweight — they are smaller and weigh less than the average smartphone.

## FOOTAGE THAT'S AS GOOD AS BEING THERE WHEN AN INCIDENT HAPPENS

VideoBadge uses a wide-angle, 130-degree lens for an almost panoramic view of the scene and has near field audio capture that reduces background noise. The camera records at 30 frames per second. A front-facing LED light also optionally indicates that recording is occurring, so both the user and those involved in the incident know that the scene is being recorded. Users also can create bookmarks in the footage as the incident occurs to indicate key moments in the incident.

## SECURE THE CHAIN OF EVIDENCE

VideoBadge allows users to record incidents in either evidentiary level standard definition or in high definition with a frame-by-frame time and date watermark. Its usage, operations and recording details are all logged and indexed to make it clear where the footage came from. Video and audio from VideoBadge are kept secure in the cloud — there is no removable SD card and the data is encrypted.

## LONG-LASTING, RECHARGEABLE BATTERY POWER

VideoBadge utilizes a long-lasting lithium ion battery that works up to 14 hours in pre-recording mode and can record up to 14 hours of high-quality footage. From a completely flat battery, the VideoBadge unit recharges in less than 8 hours, ready in time for the next shift. The battery will not overcharge and can be left safely in its charging station. When left in standby mode, the camera is instantly ready to record for up to 96 hours. The standard battery life is up to three years. Pre-recording modes, recording in HD and the strength of the Wi-Fi signal will impact the battery life.

## OVERVIEW OF KEY FEATURES

- Wide angle, 130-degree horizontal field of view
- Day and night recording capability
- RFID touch-assign enabled
- Integrated pre-record function
- Rated for use in extreme weather conditions
- Small and lightweight device housing
- Up to 14 hours of recording time per VideoBadge device
- Lithium-ion battery that recharges in less than 4 to 8 hours from a flat battery, depending on model
- Download one hour of recording in just 5 minutes



# VIDEOMANAGER™

## COMPLETE CAMERA EVIDENCE MANAGEMENT

### CREATE EVIDENCE-READY FOOTAGE FROM ANYWHERE—FAST, SIMPLE AND SECURE

VideoManager™ is a cloud-based tool that offers you complete control over your VideoBadge cameras. Providing the most advanced software tools, VideoManager helps organizations tell the real story of what happened during an incident. By working with evidence footage in the cloud, an organization's personnel can work on the case securely from any device with a Wi-Fi connection. VideoManager helps show all angles of a scene, from the body worn camera perspective of an organization's representative to the closed-captioned cameras that also captured the incident.

### SEARCH THOUSANDS OF HOURS OF CAMERA FOOTAGE AT ONE TIME

With the VideoManager advanced search tools, users can see detailed thumbnails of footage and filter results by operator, date, time and specific VideoBadge. As VideoBadge captures 30 frames per second, the VideoManager platform becomes an easy way to efficiently prepare evidence.

### GO FROM CAMERA TO COURTROOM WITH EASE AND INTEGRITY

VideoManager includes the ability to track and log who accesses footage and when, as well as what editing actions may have been taken. The VideoManager log cannot be erased or altered. It also logs when the cameras are used and by whom. This secures the footage's chain of custody and ensures that any actions taken have not compromised the integrity of the footage as evidence in a courtroom. Evidentiary footage remains intact over time, while other non-essential footage is deleted in accordance with your data retention policies through auto-configurable controls.

### FOCUS ON POTENTIAL PERPETRATORS, NOT BYSTANDERS

Use the VideoManager highlighting and redaction tools to show that a potential threat actor was on scene while securing the identities of innocent bystanders. None of the original footage is erased or modified when images are highlighted or redacted, which maintains the veracity of the evidence. These tools do not require additional training.





## ■ COLLABORATE INTERNALLY AND WITH OTHER AGENCIES

Easily share video footage with other organizations and law enforcement officials by providing a secure, traceable and shareable footage link. The VideoManager platform also maintains an audit trail of any time the footage is shared — inside or outside the organization.

## ■ LIMIT ACCESS TO FEATURES BY INDIVIDUAL ROLES

Use the VideoManager role management tools to secure access to different types of footage and incidents. Only permit certain officials to have the ability to view and/or edit footage from body worn cameras.

## ■ INTEGRATE WITH VIDEO MANAGEMENT SYSTEMS

VideoManager enables Wi-Fi connected cameras to present streams and recorded footage directly into an organization's Video Management System (VMS)—even when connected via a 4G hotspot.



### KEY FEATURES



- ▶ One-click redaction tools that allow you to crop and redact the identity of innocent bystanders



- ▶ Role-based security and access tools help secure the integrity of all footage by limiting access to specific users



- ▶ Web-based access lets you work from any computer, tablet or smart phone with a Wi-Fi connection



- ▶ Comprehensive audit trail tracking who accessed the footage and what actions were taken



- ▶ Platform integration of third-party camera footage allows you to access more angles of an incident scene



- ▶ Massive scalability permits the platform to work with thousands of cameras at once while maintaining scale



- ▶ RFID assignment helps you quickly assign a camera to a user and know exactly which users and cameras are in use

# BALLISTICS COMPARISON

With BallisticSearch™, agencies of any size can process ballistic evidence recovered from crime scenes to develop investigative leads. Agencies can now easily capture images of discharged cartridge cases and search and compare to other cartridge cases within the BallisticSearch nationwide gallery of cartridge cases in minutes. This can minimize or eliminate backlogs that may date back hours, days, weeks, months or years.

## ■ BALLISTICSEARCH™

Within minutes, an agency can upload the cartridge case, analyze the cartridge case, run a search, and compare the cartridge case to a list of cartridge case candidates and deliver potential links.

- Connect crime scenes where a potential link can be established
- Reduce and eliminate backlogs

- Commence comprehensive collection practices of cartridge cases within a jurisdiction
- Identify pattern crimes
- Nationwide sharing
- Affordable and scalable
- Reduce crime rates

## BALLISTICSEARCH™



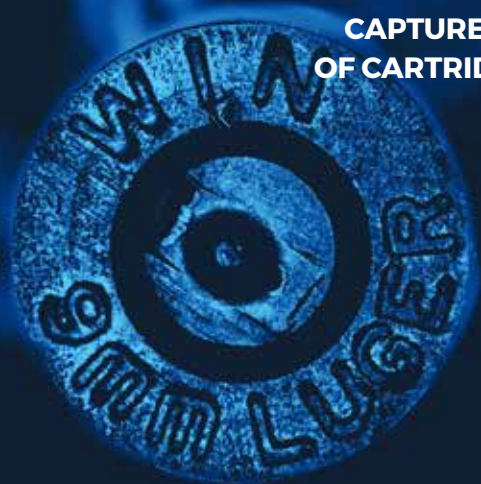
**CAPTURE IMAGE  
OF CARTRIDGE CASE**



**ANALYZE  
CARTRIDGE CASE**



**LINK SHOOTINGS &  
IDENTIFY FIREARM**



Utilizing proprietary image analysis, BallisticSearch produces investigative leads in minutes ... even while at the crime scene.

# GUN CRIME MAPPING

Gun violence is a global epidemic. The worldwide gun cache is more than 650 million firearms, and more than three people per 100,000 are the victims of a gun-related crime. While mass shootings dominate media headlines, those in law enforcement know that mass shootings make up only a small proportion of gun deaths. Vigilant Solutions is committed to reducing gun violence through ballistics image capture and analysis and crime gun mapping.

## GUNOPS™

Vigilant's GunOps is a user friendly, interactive investigation tool that allows firearm examiners, detectives and intelligence analysts to work as a team linking crimes, guns and suspects. GunOps is a cloud-based, secure, on-demand software application that uses resilient and proprietary grid storage technology. It enables the user to input and ingest data, sets such as Records Management Systems (RMS) data, Computer-Aided Dispatch (CAD) data and Laboratory Incident Management Systems (LIMS) data on gun-related cases easily and readily visualize the relationships between them in terms of time, proximity and firearm evidence characteristics. The solution has an extensive API, allowing for full access to the secure cloud and third-party application development, including secure chat.

Law enforcement agencies can use GunOps strategically to link crimes by mapping out hot spots and using advanced analytics to take the prolific offenders off the street earlier and faster, thereby reducing violent crime. Additionally, GunOps visualization and association capabilities are used by law enforcement agencies to deploy their department's resources more efficiently, where and when they are needed.

- Highly intuitive and interactive, it allows users to put it to work with little training.
- Pin-point hot spots and put resources where they need to be in real-time.
- When integrated with Vigilant's investigative platform users can map ballistic, LPR and facial recognition data in one place.

<https://www.cnn.com/2017/10/03/americas/us-gun-statistics/index.html>  
<https://www.vox.com/2018/8/29/17792776/us-gun-deaths-global>



The background is a dark blue gradient with glowing white and light blue lines that resemble a circuit board or data pathways. On the left side, there is a vertical grid of lines. On the right side, there are more complex, branching circuit-like patterns. The overall aesthetic is high-tech and digital.

# DATA FUSION



# ACCESS AND UTILIZE MORE INFORMATION

All nations share a common struggle to identify, locate and catch criminals. Vigilant provides the only law enforcement, security and counter-terrorism platform of its kind in the world, fusing critical data together and delivering actionable intelligence to agencies. These data insights reveal criminal patterns, identify traffic trends and unveil non-obvious associations, enhancing a nation's ability to identify, assess and share information on crimes and potential threats to the nation, its citizens; economic, trade and investment systems; and critical infrastructure.

## INTEGRATED DATA SETS

### Supporting national security

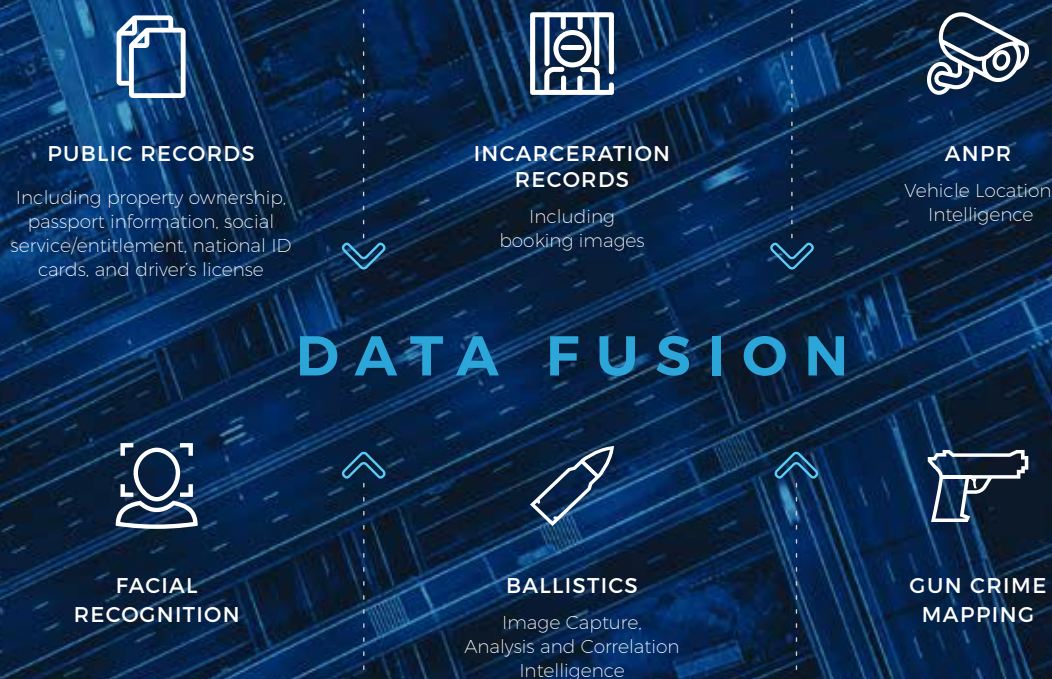
The LEARN® data fusion platform serves as an effective capacity building program that supports the national security plans in the following ways:

- To ensure aviation security using ANPR, facial recognition, and data fusion
- To ensure infrastructure and transportation security using ANPR and facial recognition
- To apply facial recognition biometrics in entry and (where applicable) exit procedures

- To increase and better coordinate counter-terrorism activities through collaboration and capacity building in accordance with the relevant rules and practices

### Integrated data sets

Vigilant's data fusion platform takes in available data sets from numerous sources, including national data records, and processes it to provide the only national law enforcement, security and counter-terrorism platform of its kind in the world.





## ANPR FIXED SUCCESS STORIES

Vigilant's implementations have helped reduce crime, generate revenue and increase productivity across the globe. The following stories are from Vigilant clients:

### **RIO OLYMPICS**

Vigilant implemented a network of fixed ANPR cameras throughout downtown Rio de Janeiro in advance of the 2016 Summer Olympics. The 57 sites recorded hundreds of thousands of images per day which were utilized by police to help manage the widespread crime throughout the area.

### **MEXICO CITY**

More than 400 Vigilant ANPR cameras are being utilized throughout the municipality of Mexico City. These installations are not only capturing the plates, but are also combining RFID and ANPR speed technology to provide a combined solution unique to the market.





## FACESEARCH™ SUCCESS STORIES

### **QUITO ECUADOR**

Alongside various government agencies, Vigilant designed a special configuration of facial recognition for house arrest to allow the government agencies to verify a person's location definitively, while saving budgeted dollars by allowing for early release of criminals from over populated jails.



# SAFE CITY SOLUTIONS

**FIGHTING GLOBAL THREATS AND HELPING NATIONS  
IMPROVE QUALITY OF LIFE AND SAVE LIVES.**

No one puts more usable data at your fingertips than Vigilant Solutions. As the industry leader in image analytics for national and local law enforcement, Vigilant's technology is highly sought after for its ability to quickly query and create actionable intelligence.



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