



# Mobile Surveillance in the Public Safety domain

HOW MOBILE SURVEILLANCE CAN IMPROVE WAYS OF WORKING, SAVE COSTS AND INCREASE OVERALL SAFETY.

**Soliton<sup>®</sup>**

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# INTRODUCTION

The public safety domain consists of many public facing organizations that includes law enforcement, first responders, civil rescue groups and border control people. They all have something in common – to keep public order and to save lives. A critical part on delivering on their operational duties, is the ability to securely and reliably live stream video from a remote location back to a command and control room.

The current challenges facing the public safety domain are mainly cost saving, improving communication, accountability and removing the reliance on older, less innovative technology. Video surveillance and live streaming has proven to be a fitting solution for some of these challenges. However, there is a pressing demand for a more innovative solutions to be able to continue to address the emerging and enduring needs of emergency workers.

Mobile surveillance is different to traditional fixed surveillance. It enables public safety workers the flexibility to be mobile and move to where the action is, allowing unfolding situations to be viewed in absolute real time by commanders back at base with an insight that was previously unachievable.

In this whitepaper, the advantages of using mobile surveillance in the public safety domain is discussed. It explains how this innovative technology can help solve the challenges of public safety workers, improve ways of working, save costs and increase overall safety.

Enjoy the reading!

**Team Soliton Systems**





## **CHAPTER 1.**

# **CHALLENGES IN THE PUBLIC SAFETY DOMAIN**

Working in the public safety domain carries an immense responsibility for people's welfare. Identifying new methods to improve the public safety system while reducing costs in a time where threats are becoming more serious, criminals smarter and social distancing is becoming an everyday requirement requires more efficient operational methods. In order to improve achieve this, it is essential to first map out current challenges and identify areas for improvement.



### **1.1: Blind spots: limited viewpoints**

The traditional use of fixed cameras in public surveillance is very limiting in allowing first responders and public safety workers to monitor issues. Although this type of surveillance enables public safety workers to have an extra pair of eyes, it also creates blind spots and stands in the way of dynamic monitoring.

Mobile streaming from bodycams, cars or drones enables a field of vision that was previously difficult to achieve from fixed surveillance cameras alone.





## **1.2: Slow decision making**

Currently, officers back in the command centers receive limited information about unfolding events. The information that is received is often incomplete, is an audio description and with video can be incomplete arriving too late after the event. Even a latency of greater than 1 second is too long for making operational decisions on video alone.

## **1.3: Reliance on expensive, old technology**

Using cameras for public surveillance is not new. The use of fixed cameras has been advantageous in the public safety domain and nowadays they are fully integrated into the daily operational process. However, there are some significant disadvantages in using this technology by itself.

Current technology that can be mobile, for instance, becomes unreliable when relying on a single mobile network provider, public Wi-Fi or when using RF technology with line-of-site for live streaming. Reliability, quality and cost are major concerns.

Additionally, current video surveillance technology is not capable of mobile streaming high quality full HD videos with a small latency.

Using a mobile live streaming device that can connect to a mobile camera which in turn can compress video and live stream over multiple mobile phone providers simultaneously, provides numerous advantages in regards to reliability, video quality and limited delays. It also enables adaptation to the emerging requirements of live streaming from devices such as body cameras, drones, boats, helicopters and other moving vehicles.

## **1.4: Lack of targeted evidence collecting**

Having video proof of events unfolding often provides indisputable evidence of which event has occurred and who is really at fault. It has to be admissible in court.

## **1.5: Accountability**

To maintain trust in our public services, reducing conflicts within the public safety domain is of high importance. Officers should feel safe and protected while working but should also be held accountable for their actions.

However, nowadays when false claims are being made against public safety workers, there is a high level of difficulty in protecting them. A lack of evidence makes it difficult to overrule these false claims and defend employees.



## **CHAPTER 2.**

# **TRANSFORMATION OF THE PUBLIC SAFETY DOMAIN THROUGH MOBILE VIDEO SURVEILLANCE**

Mobile video surveillance can help solve important challenges currently being faced in the public safety domain.

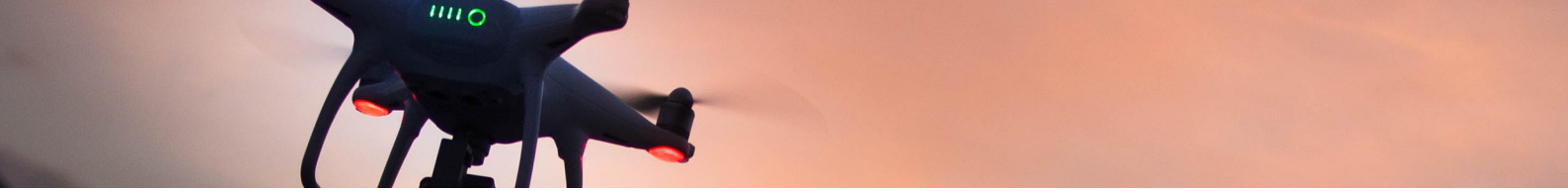


## **2.1: Benefits of mobile video surveillance for the public safety domain**

Using mobile surveillance in the public safety domain can help to improve ways of working and increase safety.

Mobile surveillance provides instant live streaming from devices such as drones, action cameras, helmet cameras, hidden cameras and in-vehicle cameras that can be used for live video analytics by using professional VMS solutions.

It also allows collection of other types of data such as GPS location, connection status and ID from the field units.



It facilitates dynamic monitoring which enables public safety workers to be where the action is. Mobile video surveillance allows live streaming from an angle and location that was not previously available by being able to go where the action is as oppose to a fixed surveillance camera which relies on the action being in the vicinity of the camera.

In turn, the real-time reporting back to the command center enables operational decisions to be made based on what they can see enabling better informed decision making.

Video can be viewed and recorded within an existing Video Management System.

This is especially apt in the case of public disturbances, riots and crowd control for operational decision making and evidence gathering.

Another advantage of mobile video surveillance is the possibility to use it anywhere, even in remote areas. Where the previous generations of older technology was bulky and unreliable, new mobile surveillance solutions enable high-quality video reporting with a much smaller latencies under many varying and hostile environments. This helps to adapt to the emerging requirements of live streaming from body cameras, drones, and other mobile vehicles.

This high-quality reporting, in turn, facilitates dynamic and more targeted evidence collecting. It helps to reduce time spent collecting evidence and lowers costs as less

## 2.2: Valuable characteristics that help solve current challenges

### High quality video

To efficiently use mobile surveillance in the public safety domain, it is necessary to have broadcast-quality video at one's disposal. High-quality video, being mobile broadcasting equipment that enables HD-SDI/HDMI (1080i/1080p) video standard for full HD TV.

High-quality video is important as it provides the command center with more valuable and detailed information to make appropriate decisions and take necessary actions. Subsequently, it enables the use of live streaming for a large variety of other purposes, for example, real-time facial recognition.

### Reliability

The fluctuating availability of the 3G, and 4G network makes it difficult to maintain HD quality streaming and provide users with reliable content. Mobile streaming equipment therefore requires H.265 compression capabilities and adequate technology to enable





high-quality broadcasting even in remote areas with unreliable 3G or 4G networks. 5G networks will improve bandwidth and lower latency but despite the promises, is largely unproven. But any procured technology should be future proofed to take advantage of current evolving technologies including 5G.

In the case of the absence of a strong network, the technology should bond several mobile phone networks together, allowing videos to be sent reliably in real time, even if one of the networks has no signal or has a heavy congestion of users.

Utilizing the latest video compression techniques such as H.265 HEVC ensures the highest quality video can be transmitted with the least amount of bandwidth. And in addition being able to utilize an adaptive bitrate technique, such as RASCOW, allows the most optimum video signal to be sent in the event of low signal or if the mobile networks are congested by many users such as at a heavily attended public event. Having the ability to send full HD 1080i encrypted video over a 2Mb/sec public network with a latency of under 0.5 seconds should be a minimum threshold of any transmission technology for public safety.

## **Encryption**

It is essential in the public safety domain that confidential information is streamed safely. Any public mobile operator including 3G and 4G LTE networks can be vulnerable. Secure communication is therefore of the utmost importance.

To guarantee the required level of protection, mobile broadcasting equipment should support authentication and encryption. Videos are first encrypted before being sent back to the command center. At the receiving end, software will automatically decode the incoming video to enable instant viewing. A minimum encryption level of AES256 is highly recommended.

## **Latency**

Adequate decision making ensuring prompt action taking are critical in the public safety domain. In a split second situations can escalate and loss of life can occur.

A long latency could be catastrophic in live mobile broadcasting in the public safety domain, especially in remote environments where it can easily increase rapidly. It is therefore important that mobile broadcasting equipment can prevent latency as much as possible. In all cases, latency should never be more than 0.5 second. Ideally sub 100ms, even over 4G, is critical for a commanding officer to take operational decisions based on a video stream alone.



## GDPR

Since 2018 the GDPR regulation came into force. The General Data Protection Regulation (GDPR) is an extension of the existing EU data protection law, but is now dictating how all foreign, non-European companies doing business in the EU must process data of European residents.

Therefore, it is important your mobile broadcasting equipment has encryption by design, which means in the transmitting stage it is protected and would be extremely difficult for a hacker to intercept this stream and make use of it.





## **CHAPTER 3.**

# **HOW TO IMPLEMENT MOBILE SURVEILLANCE TECHNOLOGY?**

Implementing a new system in an organization can be complicated. However, mobile surveillance technology can be an exception. The most important steps to quickly implementing mobile video surveillance is shared below and the most critical future applications for this innovative technology are discussed.

### **3.1: Get the right equipment**

Another advantage of using mobile surveillance technology? It is plug and play. Mobile broadcasting equipment can easily be used in combination with existing cameras and infrastructure.

### **3.2: Set up infrastructure**

To be able to broadcast videos back to the command center, an infrastructure has to be set up on the receiving end. This infrastructure can be complementary to existing systems such as VMS systems with utilization of open video formats such as ONVIF, non-proprietary interfaces and proven integration.

Software at the receiving end enables users to receive videos streamed via different 3G, 4G and 5G networks. The software helps to reassemble the video, being sent in separate parts through different networks and create an authentic copy of the original in less than 0.5 of a second from the remote camera to viewing at command center. Finally, the software enables secure communication by automatically decoding the encrypted content.

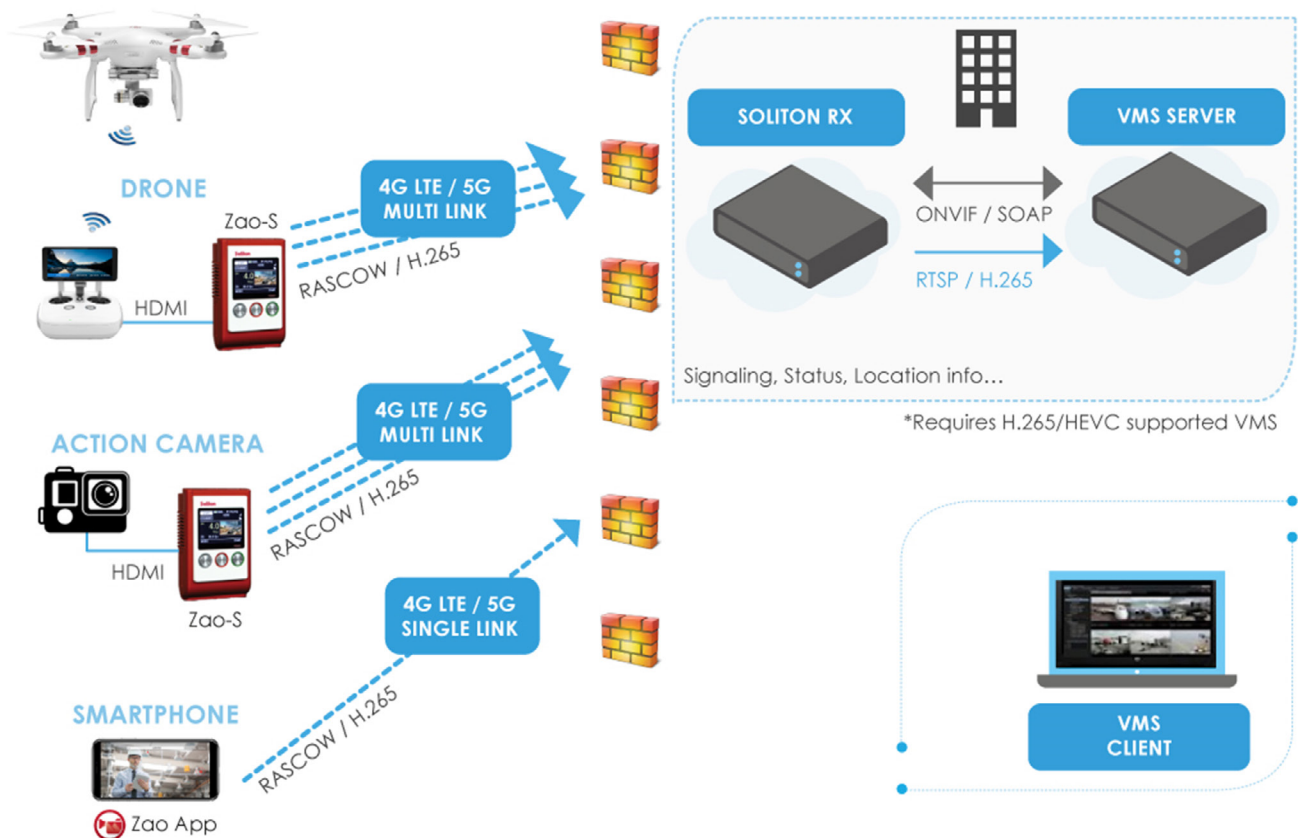


### 3.3: Get started immediately

Mobile broadcasting equipment should be easy to use for all public safety workers. After following the first two steps, the public surveillance unit is ready to use the technology in the following example scenarios:

- Drones
- First responders
- Mobile surveillance for crowd control and public disturbances
- Facial ID
- Covert operations
- Training
- Live evidence gathering
- Civil emergencies
- Natural disasters
- For pursuits on vehicles, bikes, boats, helicopters and cars

## MOBILE SURVEILLANCE APPLICATIONS WITH VMS





### 3.4: Add extensions to upgrade mobile surveillance process

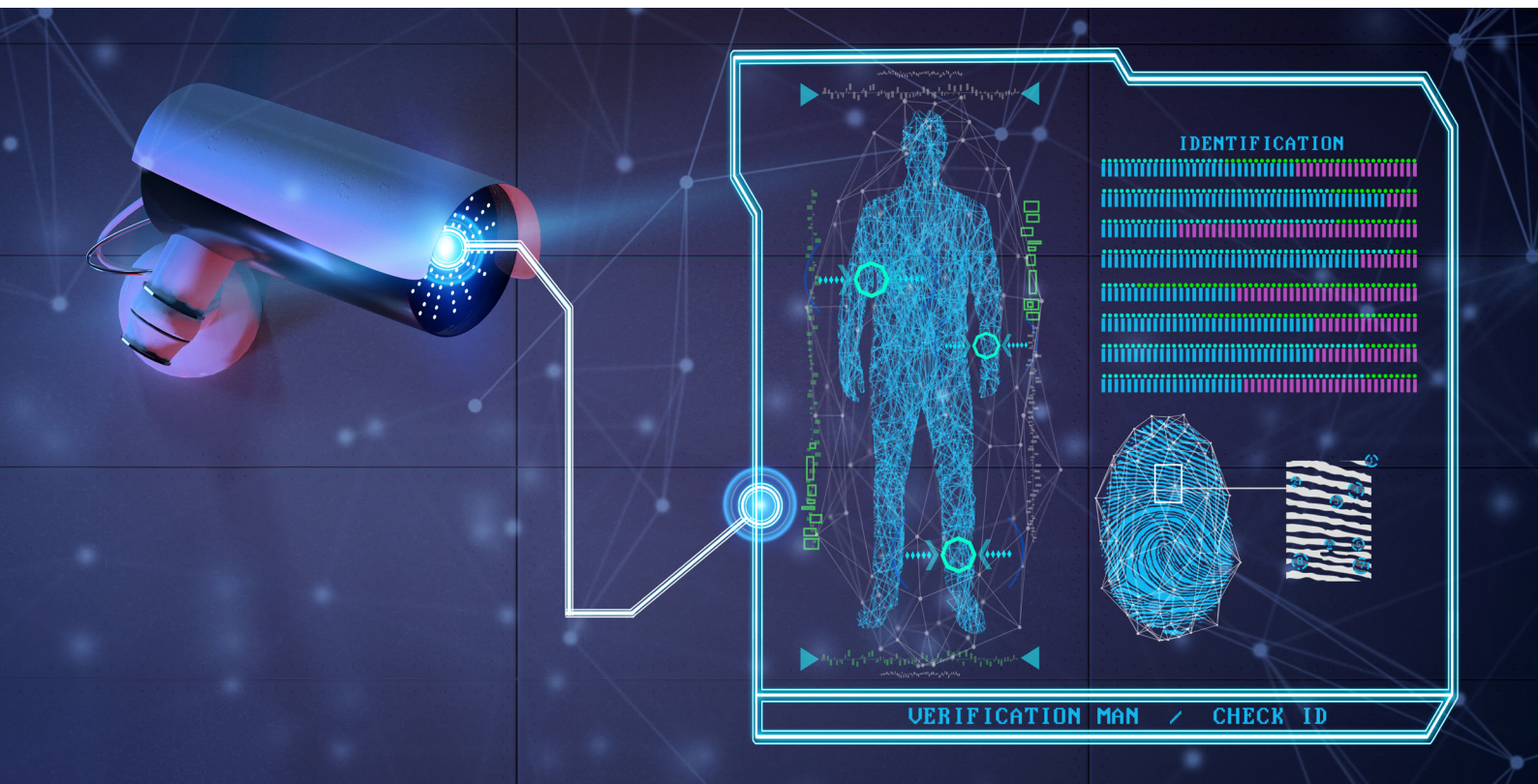
Mobile video surveillance is a sustainable technology to invest in. Not only because it is the most recent innovation in the surveillance domain, but also because of the numerous future applications. High-quality video broadcasting enables deployment of the following innovative techniques to improve public safety:

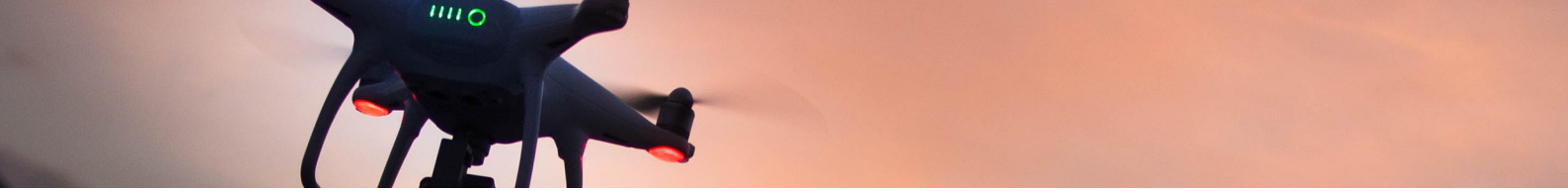
#### Drones

The ability to live stream from a drone is pivotal in many elements of law enforcement and public safety. In the past when a helicopter was needed for an aerial view, such as looking for a missing person, or evidence gathering over a hazardous site, it is much more cost effective and practical to use a drone. Live streams can be sent directly to a Video Management System (VMS) system back in the command and control room where streams are recorded.

#### Facial Recognition

One of the most promising innovations for the public safety domain is real-time facial recognition. Facial recognition could help public safety workers to locate criminals and take them into custody or help find missing persons more quickly.





For facial recognition to work, high-quality mobile video broadcasting in real-time is essential, enabling the user to see what is going on at that exact moment and act immediately. Mobile video surveillance technology could help implement real-time facial recognition in the public safety domain.

### **Safeguard locations**

Additionally, mobile surveillance technology could help protect important sites and detect when objects are added or removed such as explosive devices. Using mobile surveillance technology in combination with appropriate analytical or analysis software enables users to safeguard in high risk locations. In this way users will know exactly what happened when a suspect package is added or an object is moved or goes missing.

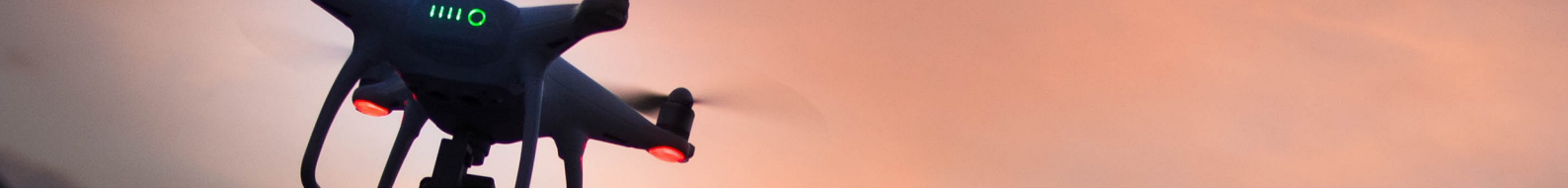
### **Thermal cameras**

Another exciting development is the use of thermal cameras in combination with mobile surveillance technology. Currently, thermal cameras can only be used when being held by a person, for example, a firefighter. However, with the help of mobile surveillance technology, the thermal camera can be put on a drone which can be sent to a burning house or forest. In this way, firefighters can easily get a clearer view of the situation without risking human lives.

### **Smartphone Apps**

Many public safety officers are utilizing mobile phones as a critical part of their safety kit. Airbus have also launched their hybrid Dabat device which is a combined Smartphone and legacy Tetra device for push to talk communications. Utilizing a smartphone app that can use the camera phone to live stream an encrypted video back to the VMS platform of a command and control center is highly desirable, low cost and is becoming more essential as an operational tool.





## **CHAPTER 4.**

### **RECAP**

The public safety domain is constantly under pressure to evolve, work more efficiently and enhance overall safety. Mobile video surveillance solves problems faced in the public safety domain and improves safety levels, reduce time-consuming activities and enable more cost-effective work.

However to do so, the mobile broadcasting equipment should have specific important features. Firstly, it should enable broadcasting of high-quality videos with low latency and high reliability. Secondly, the equipment should use encryption to guarantee safe communication. Thirdly it should use open standards to allow integration between different video management systems (VMS) that may already exist within Public Safety facilities.

The right mobile video surveillance equipment can provide many benefits to the public safety domain in terms of operational efficiencies, maintaining public order and protecting life.





## ABOUT SOLITON SYSTEMS

Soliton Systems is a leading Japanese technology company specializing in innovative technology for IT security, remote live broadcasting and special unique embedded solutions. Their mission is to develop cutting-edge technology that helps companies to solve their live outdoor broadcasting, mobile surveillance and IT security requirements with a unique set of high-quality products and solutions.

Soliton's Zao range of products addresses the needs of encrypted live streaming for the emergency services and for other public safety needs. Their solutions can reliably live stream with ultra-low latency even in areas with low cellular bandwidth through the use of their patented RASCOW technology. This allows for reliable adaptive streaming over multiple bonded 3G, 4G and 5G mobile networks, as well as wi-fi and satellite. They are ideal solutions for live streaming from helmet cams, drones, vehicles, boats and helicopters back to an ONVIF compliant VMS system within a command and control room.

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