

# **USE CASES FOR MICROCAM** ARH'S MOBILE ANPR SOLUTION











**USE CASES** 

SYSTEM STRUCTURES





# SYSTEM COMPONENTS

To understand the use cases, we have to comprehend the system components and structures as well. In the following pages we will go through the system components, namely the camera, the PoE+ cable, switch, laptop or server and the back-end.



The MicroCAM is the crucial point of the operation. It reads the license plate and it can return the LP data (text, plate type, nationality and state), sends the streams and the triggered images. These cameras are most often mounted on the roof of the patrol cars.

MicroCAM is available in four different versions. You can choose between two lens options – a long- and a short-range (wide) – and with or without on-board ANPR.

THE CAMERA

	Without on-board ANPR	With on-board ANPR
Wide, short-range optics Storage	M202 Wide	M202 Wide
Long-range optics OS	M402	M402

### LAPTOP OR MOBILE DEVICE (OPTIONAL)



It displays the captured data in real time, even showing black- or white listed vehicles. The device is also used to setup the camera remotely.

### POE+ SWITCH OR ROUTER



Its two main functionalities are acting as a power supply for the camera and channeling communication between the camera, the back-end and the laptop or tablet located in the car.

### POE+ CABLE (INCLUDED)



It connects the camera with a PoE+ switch or router. The cable acts both as a data and a power cable. A 5-meter (15-foot) long PoE+ cable is included with the camera.

### BACK-END SYSTEM



A back-end system typically comes up in the context of a complete traffic monitoring solution, or Intelligent Transportation System (ITS). However, it is not a mandatory system element.







### MICROCAM MODELS

# SHORT-RANGE MICROCAMS

(M202 Wide and M402 Wide)

These cameras are designed mostly for urban deployments; traffic situations involving slower moving traffic. Such as monitoring parked vehicles or traffic in the city on multiple lanes. These cameras are typically mounted on the roof of the patrolling vehicle rotated (panned) 45°-90° to the side, tilted down slightly. Widelens MicroCAM has a an ANPR range of 1-5 meters and a 76° angle of view.

MICROCAM MODELS

# LONG-RANGE MICROCAMS

(M202 and M402)

Long-range camera's main purpose is to monitor the traffic passing by in the neighboring lanes. They are designed to be implemented in long-range, high-speed traffic applications. Like monitoring highways, expressways or city roads. These cameras are typically looking forwards or backwards into adjacent lanes. Long-range MicroCAM has an ANRP range of 8-16 meters with an angle of view of 25°.





# **USE CASES**

Three major attributes are affecting the detection and recognition rate of the camera:

- 1. NUMBER OF CAMERAS USED it can happen that the front or back plate is not visible on the vehicle. In these scenarios a second camera can help; that camera will read the opposite license plate. This is very useful e.g. in parallel parking scenarios where the cars are usually parking very close to each other so typically only one of the plates is visible.
- 2. SYSTEM STRUCTURES ARH offers two different MicroCAMs for two different system structures. The M402 ANPR camera provides on-board ANPR which keeps the system light-weight and incredibly easy to integrate. However, since a camera of this size has a relatively small ANPR processing module it will provide a lower recognition and detection rate. The M202 combined into a powerful system can produce a higher recognition rate but then we have a bit more complex system.
- 3. SPEED OF THE VEHICLES (only at parking applications) as the overall speed difference is increasing between the targeted car and the patrolling vehicle, the camera has less time to take images of the license plate. When the camera's field of view is parallel with the movement, the speed has only a small effect.













# IN THE TRAFFIC

Monitoring city traffic while both the target and the patrol vehicles are on the move. In these scenarios the cameras are typically monitoring the adjacent lanes looking for stolen cars or wanted license plates. Another popular use is toll-control in remote areas.

#### SCENARIO #1 - POLICE PATROL

A police vehicle monitors 1 or 2 lanes continuously. The target is to scan all the license plates. Run them through a blacklist or white list and report if a wanted car was detected to the driver while alerting the HQ in the same time.

2 × M202 / lane (reading front & back LPs) **Speed:** up to 300 km/h [185 mph] (cumulated) **System structure:** Classic **Detection with recognition rate (aggregated):** ~99%

#### SCENARIO #2 - MOBILE TOLLING CONTROL AT REMOTE AREAS

A tolling control car patrols the road. It monitors the adjacent lane for cars without a valid permit. Because of the lack of constant data connection with the headquarters, the car must store and process every event (with LP data, timestamp and GPS coordinates). In other words, it has to be a stand-alone unit which has to operate completely independently from its environment.

1 × M202 / lane (reading front or black plates LPs) **Speed:** up to 255 km/h (cumulated) **Recommended system structure:** Stand-Alone Unit **Detection with recognition rate:** ~99%

### SCENARIO #3 – LIGHT-WEIGHT POLICE MOTORCYCLE EQUIPPED WITH ANPR

A truly effective way to catch criminals: a quick responding motor patrols on the streets scanning either the adjacent lane or the vehicles in front. On a display mounted on the handlebar an alert appears, when the scanned vehicle is on the wanted list. Furthermore, all the captured license plates are saved in a database. Since both the ANPR process and the crosschecking is done by the camera, the system can be really lightweight; no additional PC is required.

1 × M402 / lane (reading front or black plates LPs) **Speed:** up to 255 km/h (cumulated) **Recommended system structure:** Slim Stand-Alone **Detection with recognition rate:** ~80%















# PARKING APPLICATIONS

Scan the license plates of parallel, angled or perpendicularly parked vehicles. During this setup the cameras are rotated towards the side. Also, these cameras are equipped with an optics which has a wider field of view and a shorter ANPR range.

### SCENARIO #4 - A POLICE VEHICLE SCANS PARKED VEHICLES

The main goal is not to miss a single license plate. Since in the city every parking scenario is possible the system must read license plates from cars and bikes parked parallelly, in an angle or perpendicularly.

2 x M202 / side **Speed:** up to 60 km/h [40 mph] **Recommended system structure:** Classic **Detection with recognition rate (aggregated):** ~99%

### SCENARIO #5 – A PARKING CONTROL VEHICLE LOOKS FOR BLACKLISTED VEHICLES

Looking for non-paying vehicles in a city where are thousands of cars staying in the parking zones takes a lot of effort, money and time when it is not done efficiently. The solution is a vehicle, which reads all the license plates and crosschecks it with the database consisting all the vehicles with a valid parking ticket. When a vehicle is discovered with an invalid parking ticket the system shares the GPS coordinates with the back-end. With this method a one-man-team can scan around 150,000 vehicles during a working day where the traditional "scan-by-walking" method would cover only around 1,000 vehicles.

2 x M402 / side	
Speed: up to 60 km/h [40 mph]	
Recommended system structure: Classic	
Detection with recognition rate (aggregated):	~96% [below 40 km/h];
~92% [below 60 km/h]	

### SCENARIO #6 - MARKETING RESEARCH IN A SHOPPING MALL

A single vehicle is going through parking lots of several malls. Its objective is to determine that from which regions the cars are coming. The camera saves the license plate data (with state information) to its internal 32 Gb SSD. At the end of the day the data is transmitted and used.

1 x M402 / side **Speed:** up to 40 km/h [25 mph] **Recommended system structure:** Minimal **Detection with recognition rate (aggregated):** ~87,5% [below 20 km/h]; ~80% [below 40 km/h]















# **TYPICAL SYSTEM STRUCTURES**

No system runs flawlessly without careful planning. With the following guide we would like to present a few examples (out of many) how to integrate MicroCAM effortlessly into your system. Highlighting the advantages of the different scenarios.

#### MINIMAL

With this setup you can minimize the required equipment the vehicle must carry, therefor it is idle for motorbikes or for other lightweight solutions. No need for an industrial laptop or server on board. The recognition and blacklisting take place on the M402 MicroCAM. Then the required information is displayed on the user's mobile device or tablet which is connected to the vehicle's hotspot.

This setup includes the ANPR camera(s), a mobile PoE+ switch and the PoE+ cable(s). The camera reads the license plates and the router sends the information to the back-end system and stores it on a hard drive.

#### CLASSIC

The classic system structure is the most common in the industry. It lets the driver/operator to access the real-time database and also to receive alerts and notifications when a camera returns a license plate which was black- or whitelisted. In the meantime, the data is sent to a remote database or to a back-end system.

The classic structure requires the mobile ANPR camera, a PoE+ switch with remote access to the back end, a cable which connects the camera and the router and also a laptop.

#### STAND-ALONE UNIT

Since every required system element is located in the vehicle, this setup does not depend on the outside world. This makes it perfect for remote use on rural roads or within crowded cities where taller buildings can cause temporary network loses. A stand-alone patrol vehicle has cameras equipped and connected to a server via the PoE+ switch and cable. Nothing else is required.







