AUTOMATIC NUMBER PLATE RECOGNITION

Input Stream Guide

Carmen®Go

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1. INPUT FORMATS

CARMEN® GO supports the following formats and protocols:
- video file / stream formats: MKV (H.264), MP4 (H.264), ASF (MPEG4), MJPEG, AVI, (H.264)
- camera stream protocols: HTTP, HTTPS and RTSP

2. VEHICLE DETECTION - TRIGGERING

Carmen® GO is equipped with an advanced **vehicle detection** algorithm. This means, your camera does not need any hardware triggering for selecting the images from the stream to do number plate recognition on. **In turn, it needs a moving vehicle** (car, bus, truck, etc..) on the stream to work.

> CARMEN® GO IS DESIGNED TO WORK WITH FIXED CAMERA INSTALLATION

3. RECOMMENDED CAMERA POSITION

A good ANPR engine can read the plates from images taken in various conditions. However, if recognition rates of over 95% with short recognition times are required, the position of the camera has to be chosen carefully to produce adequate quality images for the recognition process.

Fixed camera installations may vary according to the application requirements and other circumstances such as: possibilities at the site, requests of the end-user or system planned by the integrator.

Although the installation of the number plate recognition camera largely depends on the previously mentioned conditions, yet generally three different fixed camera installation modes are possible as follows:

- Lateral (roadside)
- Transversal (on a pole, roadside)
- Overhead (on a gantry, above the road)

3.1. LATERAL (ROADSIDE) CAMERA POSITION

Lateral camera position: when the device is placed near the traffic lane or parking access lane.

In case of parking, private area access control or city road traffic monitoring applications where ANPR is necessary, the camera can be installed on the roadside.
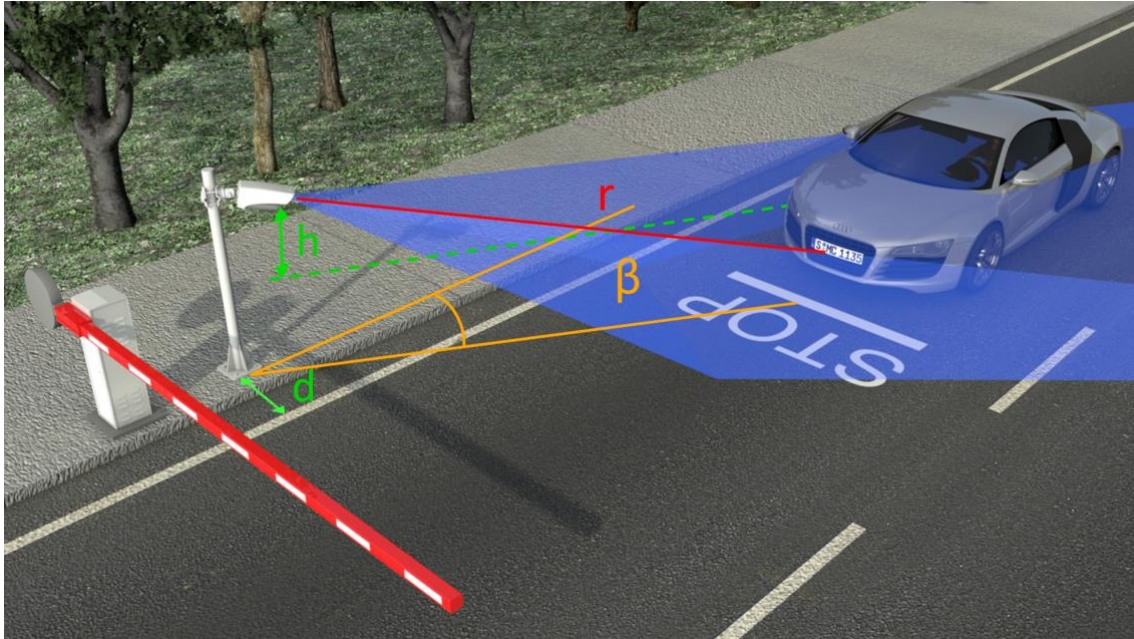
In this case, the angle between the camera axis and the direction in which the vehicle is moving should be minimal. Furthermore, the camera should be installed 1-1.5 meters above the headlights of the vehicles, slightly tilted down.

Recommended on-site installation:
- d= max 2-5 meters from the lane (the closer the better)
- directed to the lane - max: β = 20 - 25°
- h= approx. 1-1.5 meters **above** the **headlights**
- slightly tilted down

> **!Important**
>
> The camera should always be aimed slightly downwards to the road, **NOT** to the horizon and **NOT** to the sky.

3.2.   TRANSVERSAL (ON A POLE, ROADSIDE) CAMERA POSITION

The camera should be installed on a pole near the road and it has to be directed to the vehicles by both panning and tilting.

For this mode both pan and tilt angles have to be used. Recommended on-site installation:

- d= approx. 1-2 meters from the edge of the road,
- h= approx. 3-6 meters high.
- Pan: directed to the lane - β = max. 20 - 25°
- Tilt: α = max. 25° - 35°
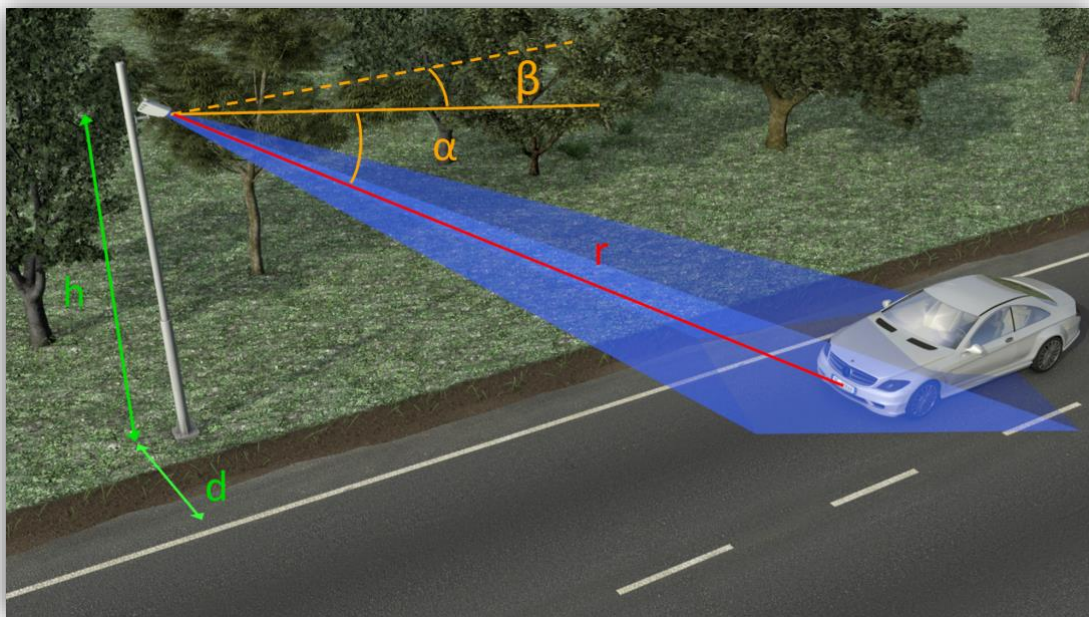
3.3.   OVERHEAD (GANTRY, ABOVE ROAD) CAMERA POSITION

In a high traffic road ANPR application, the ideal solution is to install the cameras on a gantry above the traffic lane.

The camera should be is installed above the lane (approx. 5-6 meters high) in the center (for example on an overpass or gantry, etc.). Typical field of application: fixed installation on a highway.

For this mode the pan angle is ignored because it will be mounted above the lane and it will be only tilted.
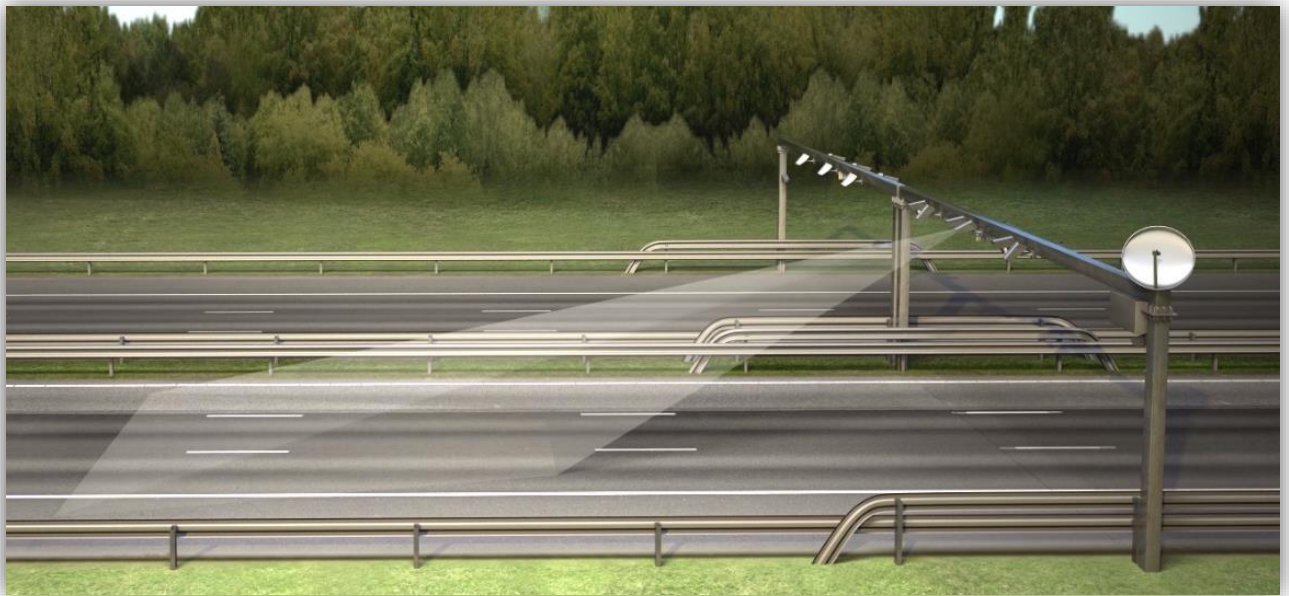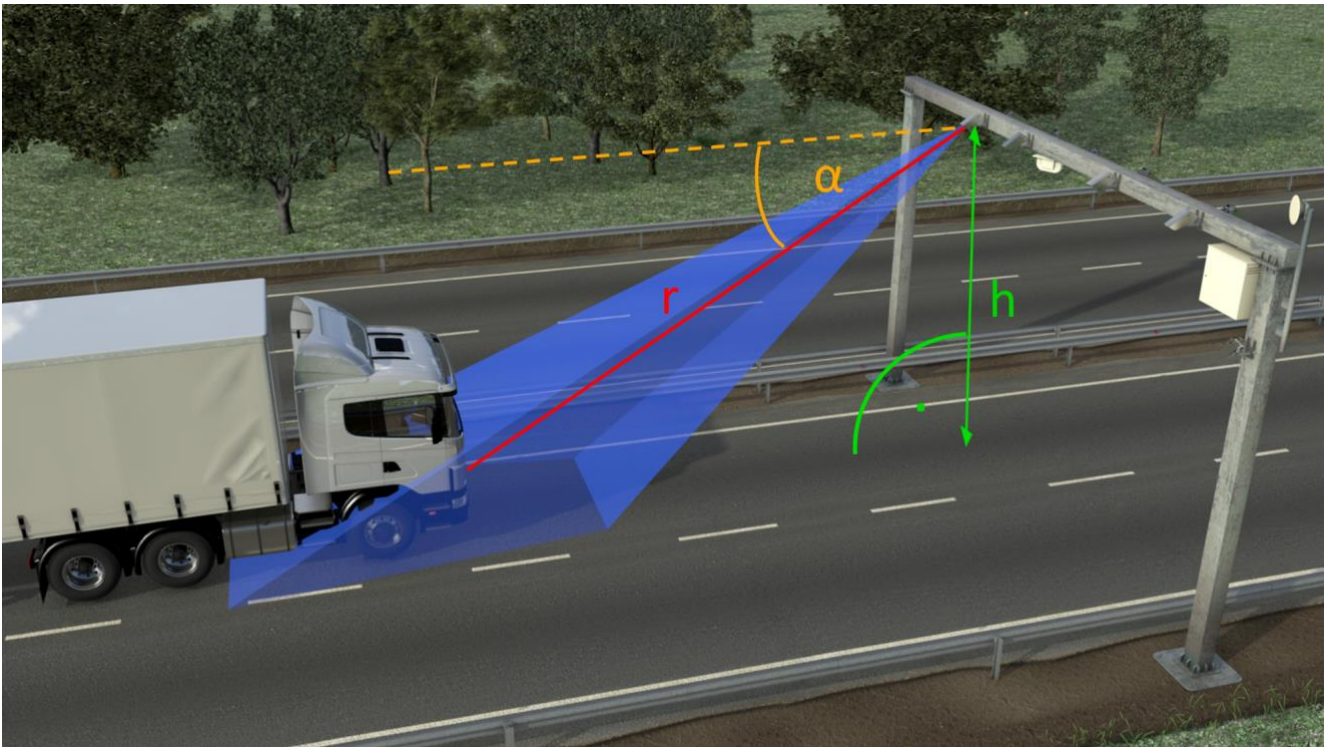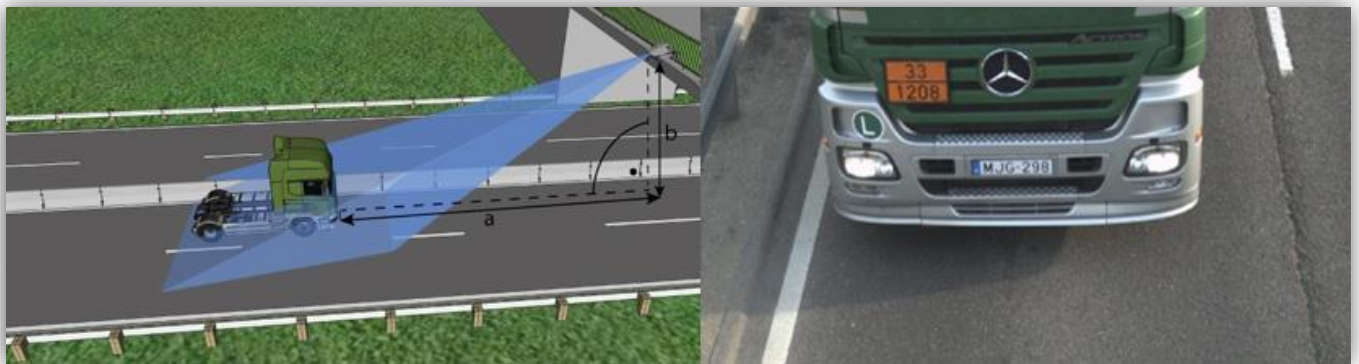
Recommended camera installation:

- α = max. 25° - 35°
- h = approx. 5-6 meters

A good example of camera installation and resulting image in case of overhead installation:

4. STREAM RESOLUTION, ZOOM, LANE COVERAGE, LIGHTING

4.1. LANE COVERAGE: ONE LANE – ONE CAMERA

Due to the nature and complexity of the ANPR task, it is recommended always to use one camera/image source for each lane.

4.2. ZOOM, RESOLUTION

There is a correlation between the resolution and the zoom setting. To get the proper character size, we have to apply different zoom settings for different resolutions.

The distance between the camera and plate is also important. If the camera is too far from the plate, the characters may not be large enough for recognition. (for proper character sizes, please see chapter 5.) If this is the case, zoom in until you reach the proper size.

For some good resolution/lane coverage/zoom examples, please see the 2 images below:
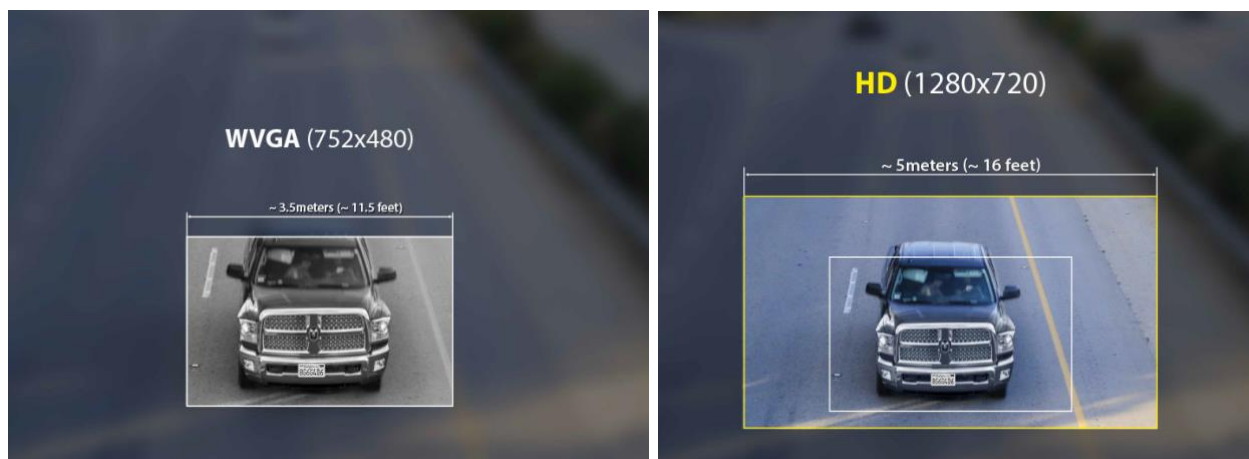
If the distance is too short, it may happen that a part of the plate is outside the camera's field of view (when the vehicle is near to the side of the lane or the plate is not in the middle of the vehicle).

4.3.   LIGHT ISSUES

The camera always has to be set and installed properly in order to avoid the following situations:

Camera is installed at the same height as the headlights of vehicles.
If there is a possibility that the headlights of a vehicle are shining directly into the camera, the light will probably cause overexposure and other related effects (flare) on the image (sensor).

View of the camera: aiming to the horizont/sky or reflective surfaces hit by sun in an undesirable angle - causing over-exposure.
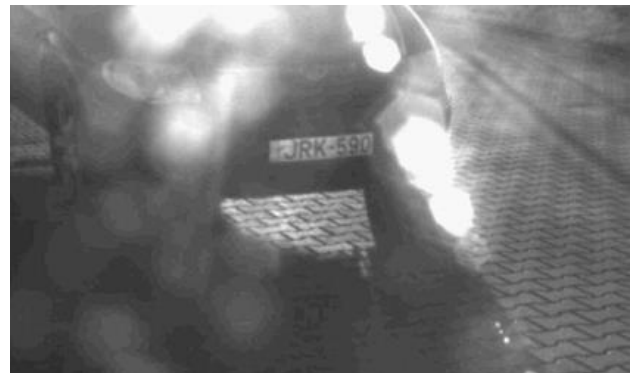
If possible, also avoid other situations that might cause poor quality image for ANPR. For example the orientation of the camera toward the sunlight at certain time of the day may also cause undesired effects that make ANPR more difficult.

Be aware, that sunlight right behind from camera is also to be avoided, as it will cause „burnout" of reflective license plates on the image.

5. CHARACTER SIZE
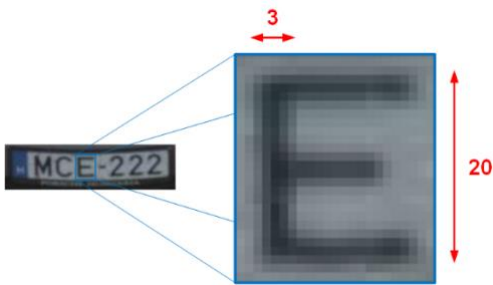
Proper character sizes (in pixels) on the sample image

For optimal ANPR/LPR results, the most important factor is the size of the characters on the image. For Latin characters it is recommended to have an average character height of at least 16 pixels. For Arabic or other special characters, it is recommended to have characters that are at least 20 pixels in height. A higher resolution is needed in the latter case as these characters are more intricate in their design.

Very low-resolution images are unusable for ANPR, but so are very high-resolution images as well. Therefore, avoid settings where the character height is greater than 50 pixels. The line width of a character on the image should be at least 2 pixels.

Recommended character sizes in pixels:

- Height, Latin characters: 16-50 pixels
- Height, Arabic characters: 20-50 pixels
- Line width: min. 2-3 pixels

6. IMAGE REQUIREMENTS

In order to expect the most accurate result from CARMEN® GO software, the processed images should contain a plate:

- with reasonably good spatial resolution (on the license plate the minimum character height is 16 pixels for Latin and 20 pixels for Arabic characters, 2 pixels line-width on the image),
- with reasonably good sharpness,
- with reasonably high contrast,
- under reasonably good lighting conditions,
- in a reasonably good position and angle of view.

Although "reasonably" is not an exact definition, it can still be easily understood if you look at the sample images below. The first six images are **NOT** usable for ANPR. The ones on the next page however, can be properly used for ANPR.

6.1. EXAMPLES TO AVOID

LOW SPATIAL RESOLUTION

BLURRED IMAGE

LOW CONTRAST

OVEREXPOSURE

HIGH DISTORTION

BAD LIGHTING CONDITIONS
(SHADOW AND STRONG LIGHT)

6.2.   STILL IMAGES FROM STREAMS, ADEQUATE FOR ANPR

DAYTIME

NIGHT-TIME

- GOOD SPATIAL RESOLUTION

- GOOD SHARPNESS

- HIGH CONTRAST

- GOOD LIGHTING CONDITIONS

- GOOD POSITION AND GOOD ANGLE OF VIEW

Contact Information

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Information regarding hardware, software, manuals and FAQ are easily accessible for customers who previously registered to enter the dedicated ATSS site. Besides offering assistance, the site is also designed to provide maximum protection while managing your business information and technical solutions utilized.

New User
If this is your first online support request, please create an account by clicking on this link.

Returning User
All registered ATSS customers receive a personal access link via e-mail. If you previously received a confirmation message from ATSS, it contains the embedded link that allows you to securely enter the support site.

If you need assistance with login or registration, please contact atsshelp@adaptiverecognition.com for help.

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