

ADAPTIVE RECOGNITION

ANPR/ALPR CAMERAS AND SOFTWARE FOR ACCESS CONTROL

User Manual

Einar



EINAR

USER MANUAL

with Installation Checklist and other practical tips

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1. OVERVIEW

The Einar camera has its own web interface through which you can access the camera settings, the **LIVE**, the **PLAYBACK**, the **EVENTS** and the **SETTINGS** interfaces.

Note

It is recommended to use an up-to-date web browser to access the web interface.

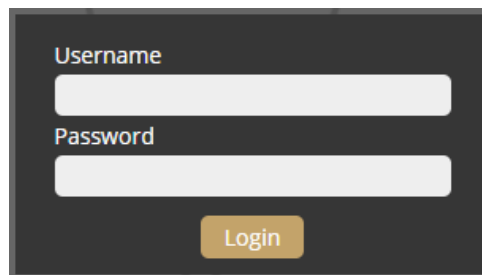
Accessing the web interface:

1. Start a browser and enter the camera IP address into the address bar of the browser.
2. Type the username and the password on the displayed login interface and click on **[Login]**.

The default user account is the following:

Username: admin

Password: admin



The screenshot shows a dark-themed login form. It contains two input fields: the top one is labeled 'Username' and the bottom one is labeled 'Password'. Below these fields is a yellow 'Login' button.

1.1. DEFAULT IP ADDRESS

The camera – by default – obtains its IP address from the local DHCP server. A second link-local IP address is always present on the primary network interface.

1.2. LINK-LOCAL IP ADDRESS

The link-local IP address of the camera can be calculated using the device's MAC address or serial number. The last four characters are two hexadecimal numbers that can be converted into the last two parts of a link-local address (169.254.XX.YY).

Example: the camera with the MAC address 00-19-B4-01-42-1A ends with 42 and 1A, representing the decimal values 66 and 26. The link-local address of this camera is 169.254.66.26.

1.3. FINDING CAMERAS

You can find the camera on the network using the [AR DeviceTool](#). Double-click on the selected camera, and the Einar camera web interface will open in the default browser.

While running, the program continuously looks for detectible cameras on the network and displays them in a list with their current IP addresses. If the camera does not appear, ensure that the firewall does not block the multicast protocol on the network and that the camera and the PC are in the same network range.



2. AR DEVICE TOOL

With the AR DeviceTool, you can discover Einar cameras on the local network and upload Firmware, License and Engine files to them. Download the program here: [AR DeviceTool](#). It runs on Windows operating system.

Upload firmware							Upload license							Upload engine						
Name	Family	Version	Firmware	IP Address	MAC address	Upload information														
ICAM-D221	EINAR	IPC-01-W	1.8.0.193	192.168.2.181	00:19:b4:00:d2:21															
ICAM-D223-PZS	EINAR	IPC-01-T	1.8.0.165	192.168.2.101	00:19:b4:00:d2:23															
ICAM-D28D	EINAR	IPC-01-WW	1.8.0.233	192.168.2.54	00:19:b4:00:d2:8d															

Devices: 3 Offline: 1

2.1. FINDING CAMERAS

Once started, the program lists the cameras detected on the local network if the cameras are on the same network segment as the computer. The camera name, product family name, type, firmware version, IP address, MAC address and brief information about the current upload process will be displayed.

The currently available cameras are marked with green color in the first column. The red color indicates a previously discovered camera that has not been available since then.

Double-click on the selected camera to open its web interface in the default browser.

Upload firmware							Upload license							Upload engine						
Name	Family	Version	Firmware	IP Address	MAC address	Upload information														
ICAM-D221	EINAR	IPC-01-W	1.8.0.193	192.168.2.181	00:19:b4:00:d2:21															
ICAM-D223-PZS	EINAR	IPC-01-T	1.8.0.165	192.168.2.101	00:19:b4:00:d2:23															
ICAM-D28D	EINAR	IPC-01-WW	1.8.0.233	192.168.2.54	00:19:b4:00:d2:8d															

Devices: 3 Offline: 1

2.2. FIRMWARE, LICENSE, AND ENGINE UPLOAD

In addition to the camera's own web interface, you can also use the AR DeviceTool to upload Firmware, License or even Engine for the selected single camera or a group of cameras using Ctrl/Shift.

Upload firmware		Upload license		Upload engine			
Name	Family	Version	Firmware	IP Address	MAC address	Upload information	
<input checked="" type="checkbox"/> ICAM-D221	EINAR	IPC-01-W	1.8.0.193	192.168.2.181	00:19:b4:00:d2:21		
<input type="checkbox"/> ICAM-D223-PZ5	EINAR	IPC-01-T	1.8.0.165	192.168.2.101	00:19:b4:00:d2:23		
<input checked="" type="checkbox"/> ICAM-D28D	EINAR	IPC-01-WW	1.8.0.233	192.168.2.54	00:19:b4:00:d2:8d		

Devices: 3 Offline: 1

Select the camera(s) you want to update and press the **Upload firmware**, **Upload License** or **Upload engine** buttons that become active.

In the window that appears, enter the username and password to access the camera, select the file you want to upload and click **Start** to start the upload.

AR Engine upload

Please add a user profile!

User: admin Password: *****

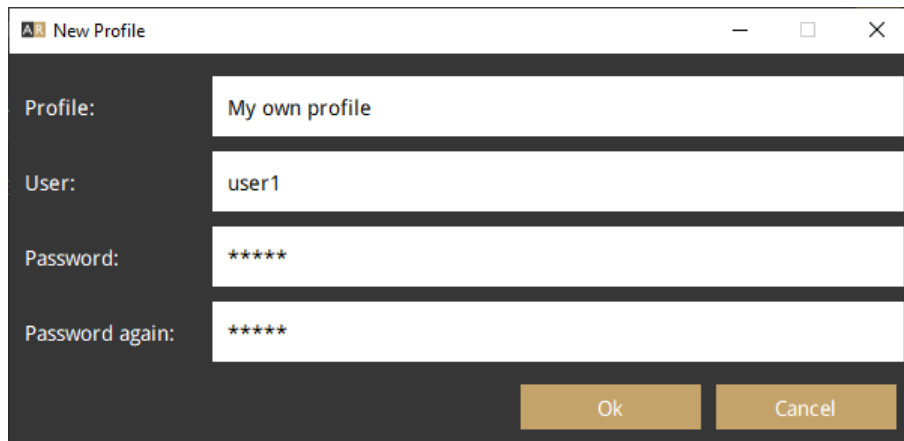
EINAR engine file: Select file...

Start Cancel

If you want to save the username and password to access the cameras, you can create user profiles to make uploads faster. This way, you don't have to enter IDs before each upload.

Click on "Please add a user profile!" or the "+" button and enter the required information. For further uploads, you will only need to select the user profile.

Previously created user profiles can be edited or deleted using the buttons next to the "+" button.



The image shows a 'New Profile' dialog box with the following fields and values:

- Profile: My own profile
- User: user1
- Password: *****
- Password again: *****

Buttons: Ok, Cancel

3. OVERVIEW OF THE WEB INTERFACE

The following menu items are available on the web interface:



1. LIVE

Shows a live view of the camera streams.

2. PLAYBACK

Browse recordings on the configured storage device.

3. EVENTS

Browse the recorded events on the configured storage device.

4. SETTINGS

Under this menu, you can access the following options:

SYSTEM

- Status
- Device
- Network
- Security
- Storage
- I/O
- Service
- Notifications

MEDIA

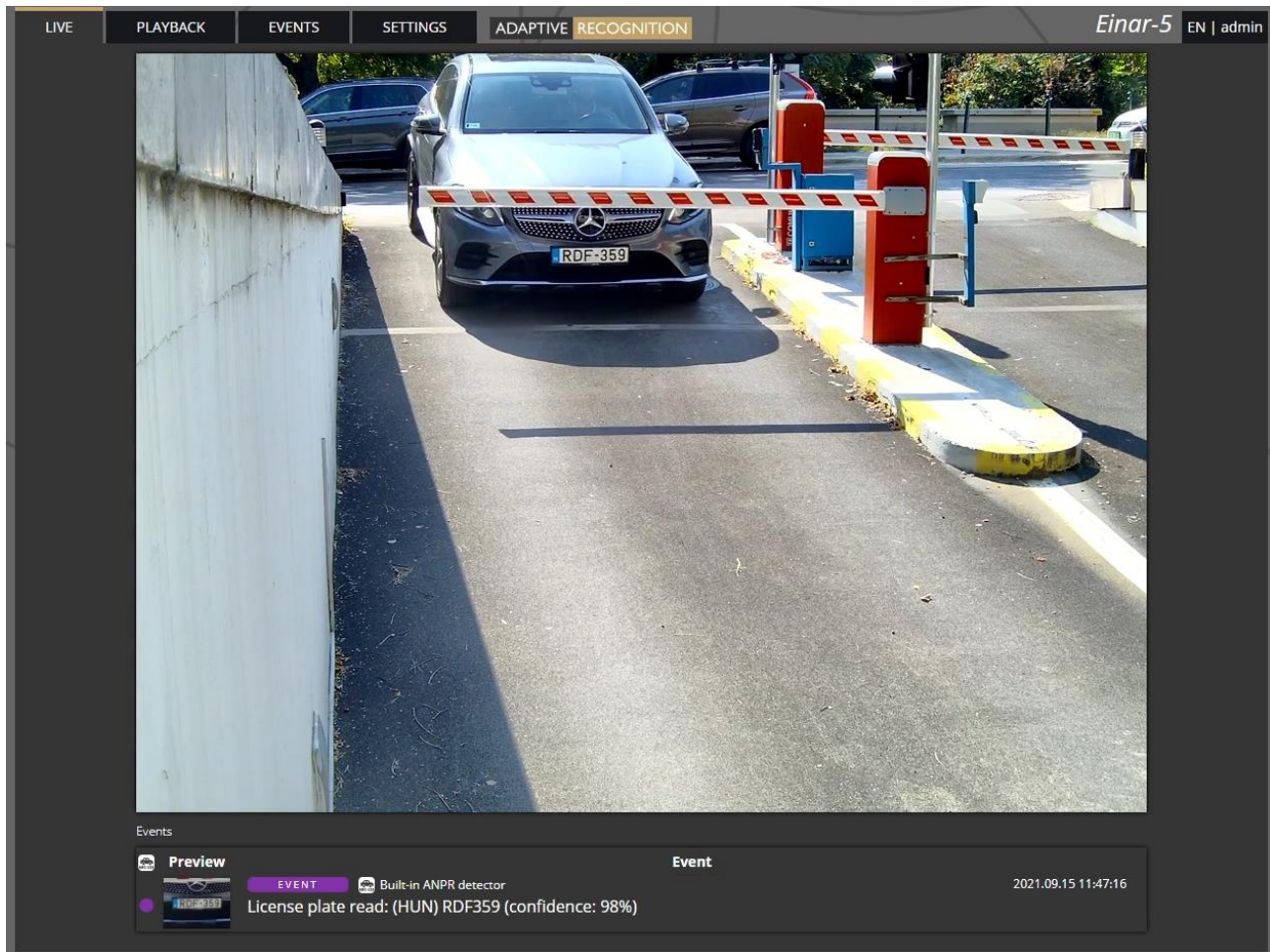
- Image
- Video
- Lens

ANALYTICS

- Settings
- Detectors

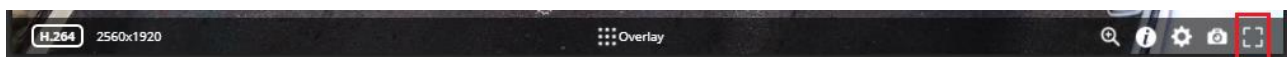
4. LIVE

After login, the interface navigates to the LIVE tab that shows a live feed of the camera streams.



4.1. FULL-SCREEN MODE

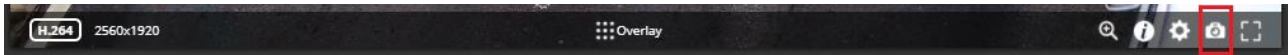
The camera's live stream can be displayed on full screen by clicking on the icon located in the image's bottom-right corner.



To exit from the full-screen mode, press the **ESC** keyboard key or click on the icon mentioned above.

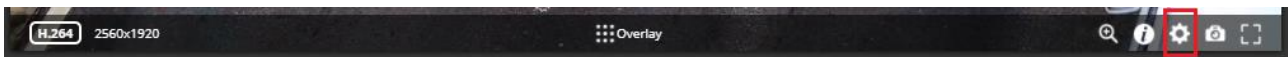
4.2. SAVING IMAGE

Next to the **full-screen** icon is the **Save image** icon. By clicking on it, you can save an image of the current live stream with previously selected OSD information. The CTRL + S keyboard shortcut can be used as well.



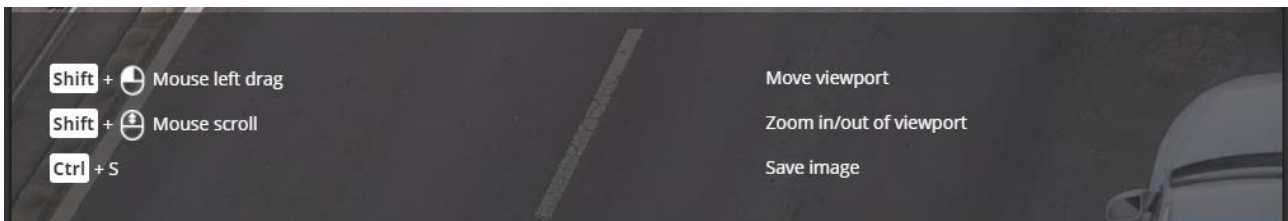
4.3. SWITCHING STREAM

The **Streams** button is located next to the **Save image** icon. By clicking on it, you can select which stream will be displayed as **LIVE**.



4.4. HELP

Next to the **Streams** icon is the **Help** button. It brings up keyboard shortcuts on how to use and navigate the video feed. To exit from the Help OSD, press the **Help** button or click on "Help OSD".



4.5. ZOOM & FOCUS

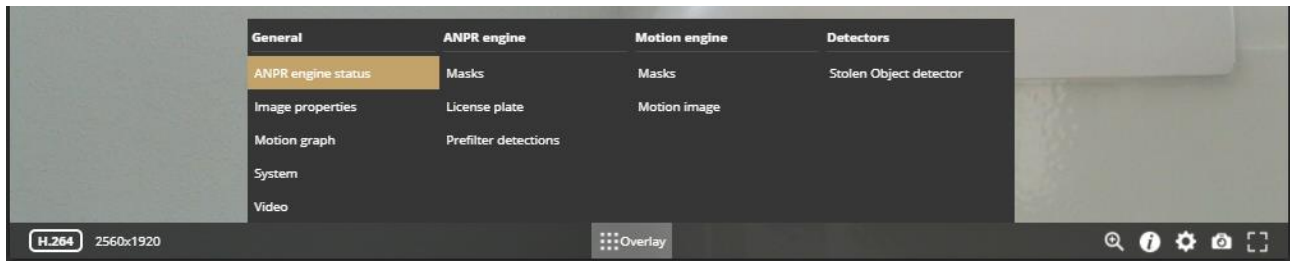
The last icon on the right is the **Zoom & Focus** button. It brings up Zoom and Focus controls to fine-tune the lens of the device. If you press the **Autofocus** button, the camera starts to look for the correct focus value by itself to achieve the sharpest image possible. With the **Focus to point** button you can select a specific point of the image what you want to be the sharpest region in the picture. To exit from the Zoom & Focus OSD, press the **Zoom & Focus** button.



4.6. OVERLAY

In the middle, at the bottom of the window, is the **Overlay** button. With it, you can turn on/off the OSD, and you can view the masks of the applied detectors, image information, motion data, etc.

The OSD layers come in handy for observing the internal workflow of the camera, setting up the device or troubleshooting.



The most important parameters related to number plate recognition can be found on the **ANPR engine status** OSD, these are the following:

Found/Read: Number of images on which the camera has started to detect („Read”) license plate, and („Found”) it. Values will be reseted after reboot.

Prefilter: „Processed” means the camera try to detect license plate in that image. „Skipped” means the camera does not try to detect any license plate in that image.

Carmen-Engine: „Processed” is displayed when the Carmen ANPR recognition module has processed an image.

Plate: Recognised license plate result of Carmen engine.

Avg. char height: Character height of recognised license plate.

Confidence: Confidence value of recognised license plate.

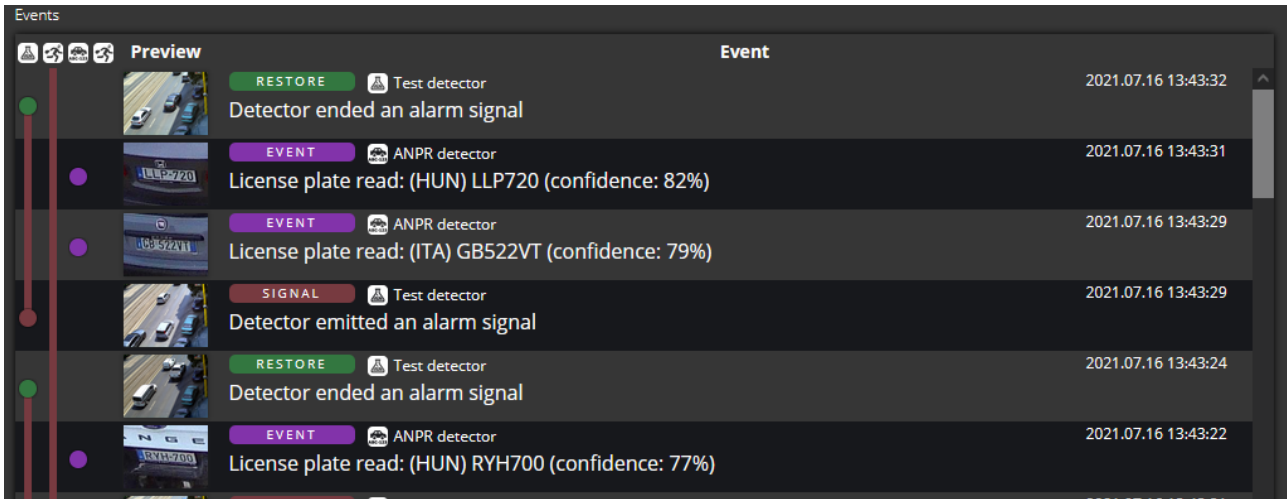
Confidence threshold: Minimum confidence value previously set in **{ANPR engine}**. License plates with confidence value below this threshold will be discarded.

Recognition memory: Recognised license plates which will not be recognised again. The time range while the recognised license plates remain in the memory can be set in **{ANPR engine}**/"Ignore same plate for (s)".

4.7. EVENT PREVIEW

You can find the event preview section under the live stream image, displaying the notifications about the latest received events.

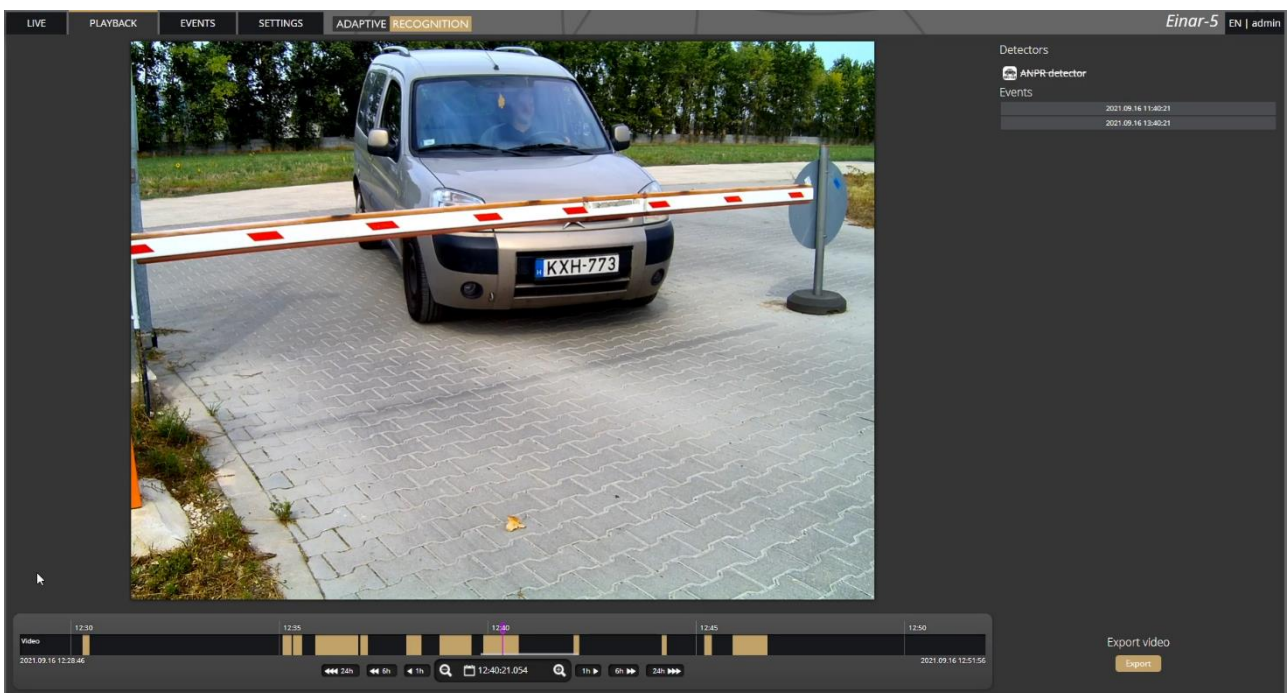
Basic events (like ANPR) are shown with a purple color and the "EVENT" text. A dark red colored "SIGNAL" text indicates a start of a longer event that lasts for multiple frames. A long event's end is marked with the green "RESTORE" text.



The list also contains the exact date and time an event was emitted. Clicking on the event's image brings up a more detailed view of that event.

5. PLAYBACK

You can access the **PLAYBACK** interface if the storage is turned on. By clicking on this tab, the recordings stored on the storage device will be listed. You can then navigate them by clicking on the timeline below the video feed.

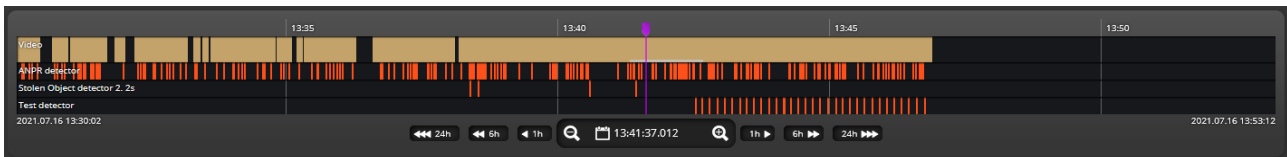


Note

In case the storage is turned off but the storage device is available, the previously recorded elements can be viewed and played if the storage function is switched on.

5.1. NAVIGATE AMONG THE RECORDINGS

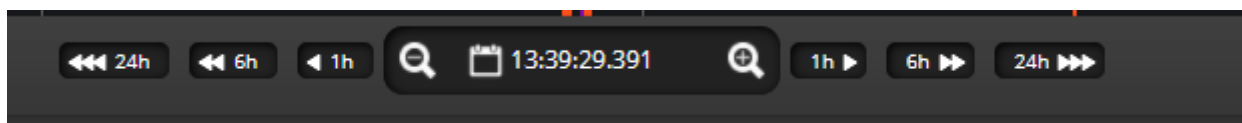
You can navigate among the recordings by using the timeline and calendar. The timeline is the black bar under the camera image. The gold bands indicate those time intervals where recordings exist. Under this section, the currently selected detectors are located. The red markers point where events have taken place.



Change the displayed timeline by clicking and holding the left mouse button and moving it to the left (backward in time) and/or to the right (forward in time). By clicking on the desired date, the timeline will skip to that point.

The displayed white stripe at the bottom of the gold timeline indicates the video parts ready to be played.

In the middle of the timeline (see image above), there is a purple marker that shows where you are in the playback. Under this section, you can also see the current time of the playback.



The magnifying glasses located under the timeline are to increase (magnifying glass with + sign) or decrease (magnifying glass with – sign) the time interval found on the timeline.

In the middle of this panel, there is a calendar with which you can seek an exact date and time to play back.

The current time of the computer can be set with the "Now" button. After clicking on the **[Done]** button, the playback skips to the selected date.

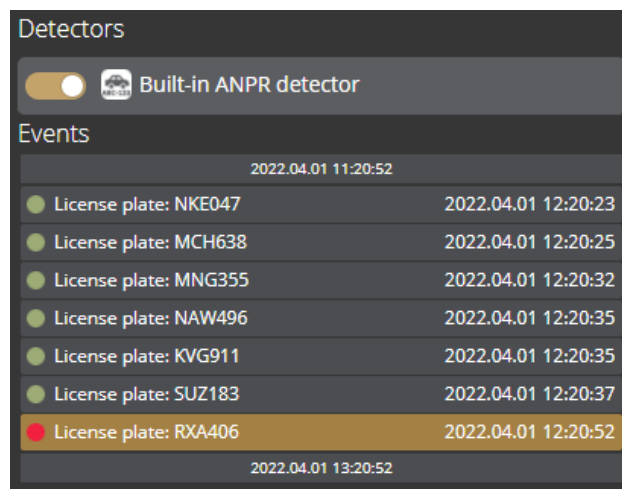
The small image that appears when the mouse cursor is positioned over the timeline shows a preview image of the video near that location.

By moving the cursor over the video, an OSD menu appears, the functionality of which is identical to the menu located on the live stream.

To modify the playback speed, click the cogwheel on the video menu and select a speed value. This is where you have the help and the image saving options.

5.2. FILTERING THE DETECTORS

You can find a list of the configured detectors and events related to them on the right side of the **PLAYBACK** interface.

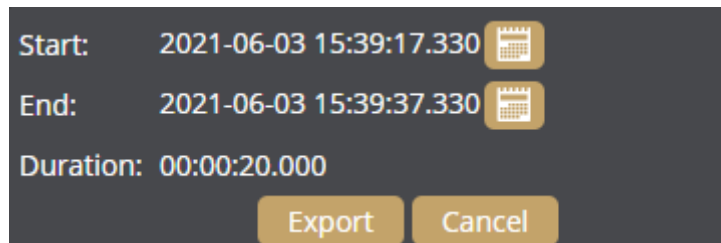


The events and timeline of each detector can be turned on/off by clicking on the appropriate detector button. Clicking on an event in the list navigates the playback to the event's date and time.

If you hover the cursor over an event located in the list, the detector related to the event is highlighted above the list. It works vice versa: by hovering the cursor over the detector, the events related to the detector will be highlighted in the list below.

5.3. EXPORTING THE RECORDINGS

Video clips can be saved as mp4 files and can be viewed in most modern video player applications. The "**Export**" button is located in the bottom-right corner of the **PLAYBACK** interface. By clicking on this button, a dialog box pops up, and two gold arrows appear on the timeline.



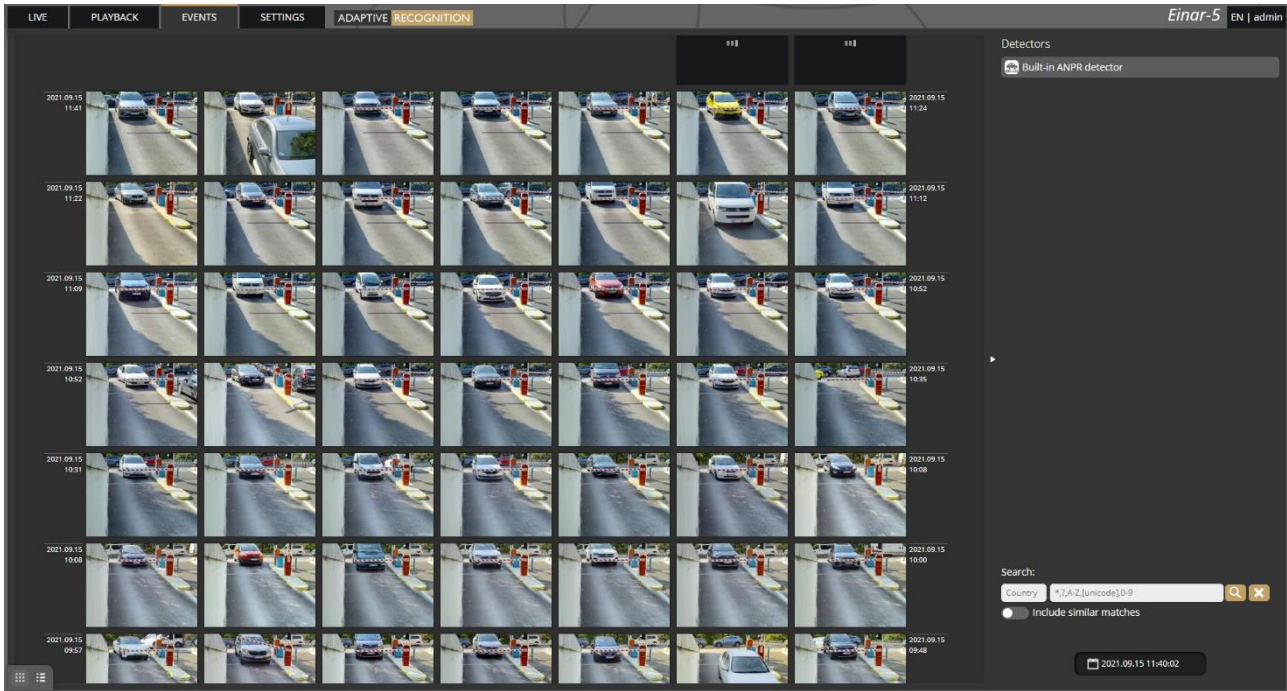
Drag the arrows with the mouse, and click the calendar buttons next to "Start" and "End" to modify the exported time range. The duration of the video to be exported is displayed in the bottom line ("**Duration**").

Note

You can adjust the exact time by clicking on the calendar icon.

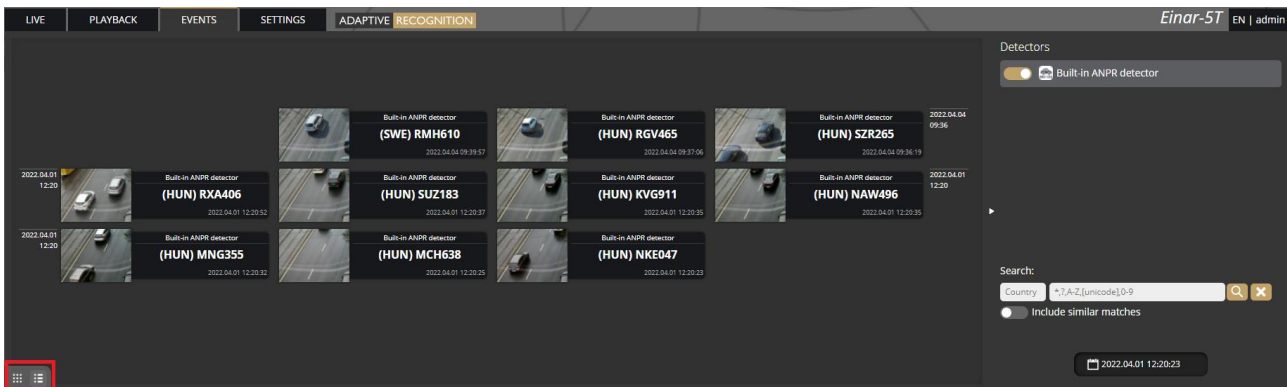
6. EVENTS

You can access the **EVENTS** interface provided that the storage is turned on. By clicking on this tab, all events recorded by the camera will be listed.

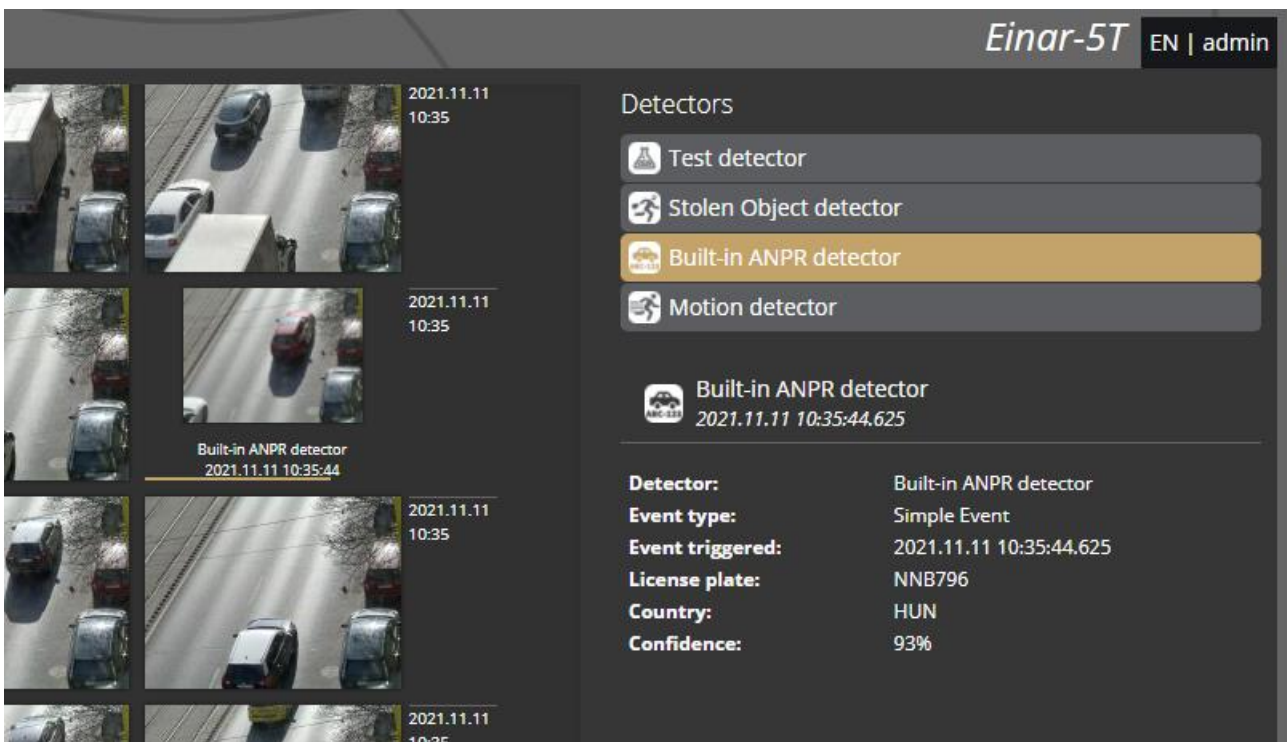


You can navigate between the recorded events in the event browser by scrolling through them with your mouse's wheel. The events appear as small images. The latest events are at the top.

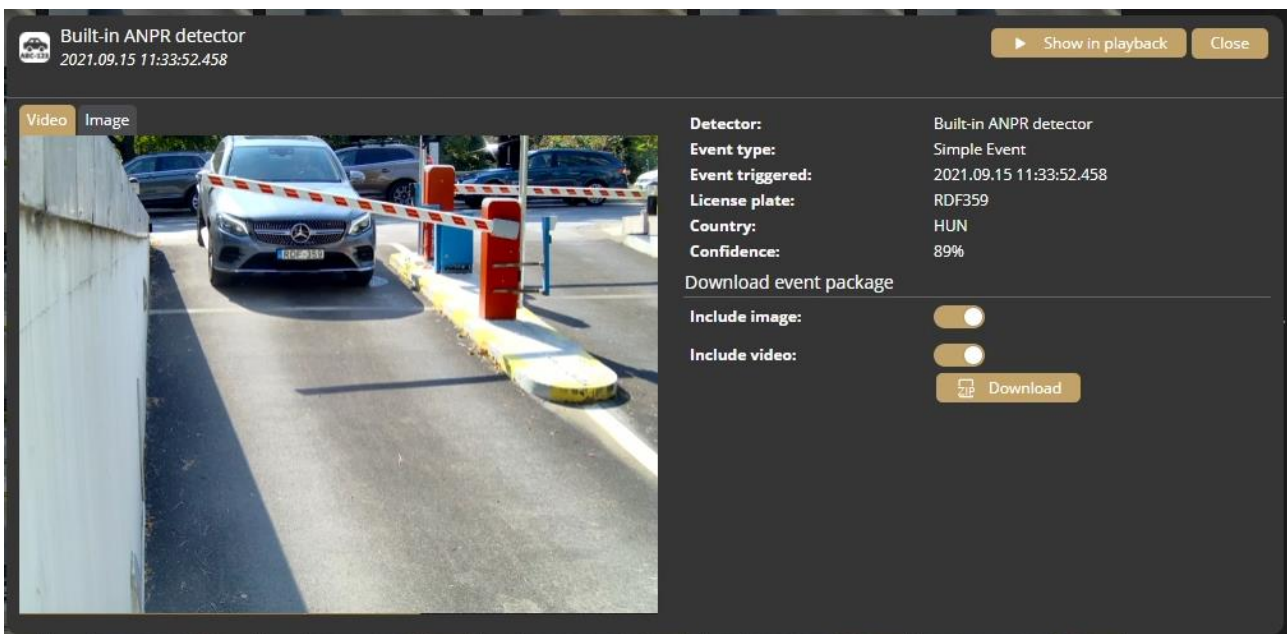
Use the buttons in the bottom left corner to switch between Grid view and Detailed view:



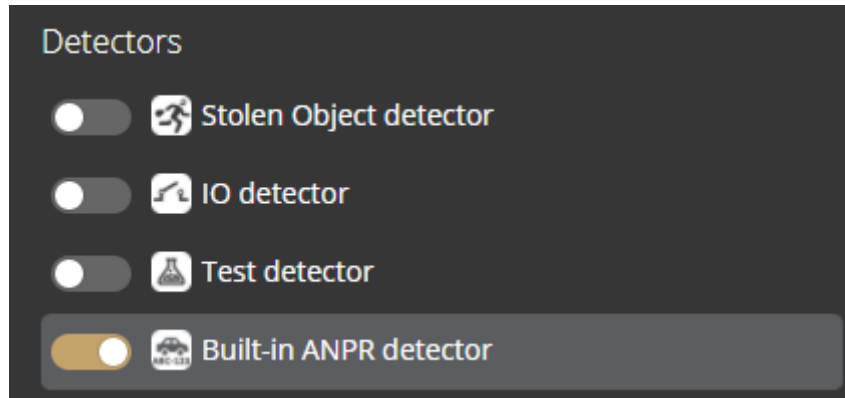
Hovering the cursor over an event, the detector related to the event is highlighted in the list on the right. Simultaneously, a video clip of the event will be loaded and played automatically.



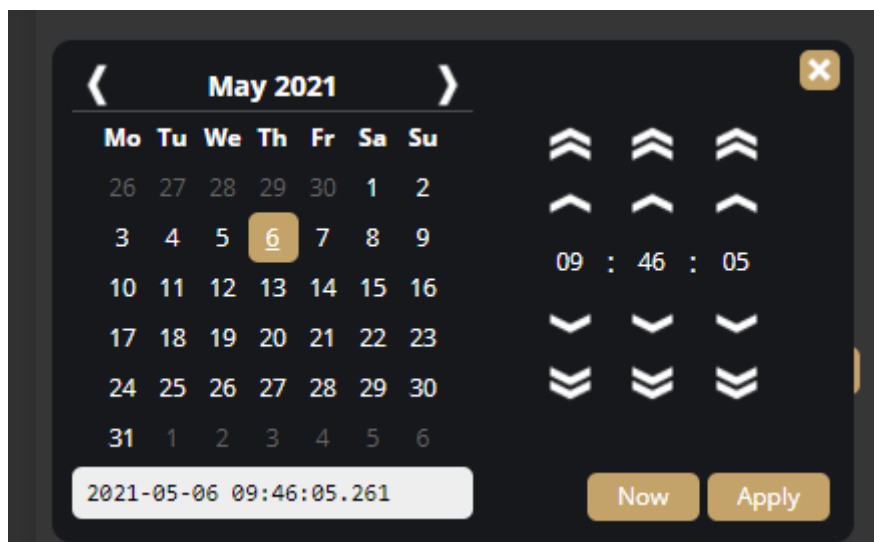
Clicking on an event brings up a detailed view of that event, including a video clip and any related image. The interface can be redirected to the **PLAYBACK** menu item by clicking on the **[Show in playback]** button. The data belonging to the event can be saved as a ZIP file by clicking on the **[Download]** button.



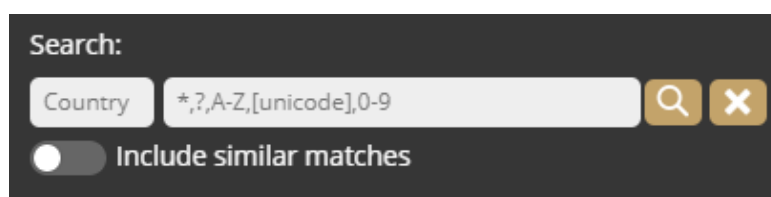
The configured detectors are displayed on the right. By moving the cursor over the detector, the events related to the detector will be highlighted in the event browser. By clicking on the detector, the display of its events can be turned on/off.



A calendar appears by clicking on the time located in the bottom-right corner. After setting the appropriate time and clicking on the [Apply] button in the calendar, the browser skips to the specified time.



On ANPR-capable devices, an additional license plate search form is available. Similar license plates can be listed if the "**Include similar matches**" option is turned on.



7. SETTINGS

The SETTINGS page contains all customizable parameters of the camera.

7.1. SYSTEM / STATUS

On this interface, you can find a summary of the important data of the camera, the installed detectors, the operating time, the ANPR licenses, etc. API documentation can also be found here for integrating.

Device

Name:	ICAM-D717	Type:	IPC-01-W
Description:	Intelligent IP camera	Serial:	221D717
Date & time:	2022.04.01 13:18:44	Firmware:	2.1.0.39
Storage:	Enabled	Location:	47.49312, 19.02404
License:	ANPR license >		Uptime:
License key:	CARMEN SPI - 1001030		

For integrating this device check out the [API documentation](#)

Network

Wired connection:	192.168.6.223, 169.254.215.23 (MAC: 0019b402d717)	DNS:	1.1.1.1, 8.8.8.8
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Video

Stream 1:	<div style="display: flex; gap: 5px;"> <div style="background-color: #c6c8ca; padding: 2px;">H.264</div> 2560x1920, bitrate: 10000 kbit/s, GOP: 30 </div> <div style="display: flex; gap: 5px;"> <div style="background-color: #c6c8ca; padding: 2px;">M-JPEG</div> 2560x1920, bitrate: 30000 kbit/s </div>
Stream 2:	<div style="display: flex; gap: 5px;"> <div style="background-color: #c6c8ca; padding: 2px;">H.264</div> 1920x1440, bitrate: 6000 kbit/s, GOP: 30 </div> <div style="display: flex; gap: 5px;"> <div style="background-color: #c6c8ca; padding: 2px;">M-JPEG</div> 1920x1440, bitrate: 17000 kbit/s </div>

Detectors

- Stolen Object detector
- IO detector
- Test detector
- Built-in ANPR detector

7.2. SYSTEM / DEVICE

On the **Device** interface, you can do the following:

- Modify the name, description and location of the device
- Reboot the device remotely
- Perform a factory reset (after clicking on the button, the original manufacturer settings are restored except for the network settings)
- Set the date and time
- Upload firmware, ANPR engine and license.

General

Device name: Location:
Latitude Longitude

Device description:

Date & time

Device time: 2022. 04. 01. 13:20:18

Use NTP:

NTP servers:

NTP status: 7m 151.236.30.71

Maintenance

Reboot:

Factory reset:

Firmware:
Current firmware version: 2.1.0.39

ANPR engine:
Current ANPR engine: 7.3.13.215 EUR

License:

Date & time settings

The camera's current time is displayed at the **Device time** using your web browser's locale. The device time can be set manually by clicking on the **calendar icon**. You can synchronize the device to the computer time with the **Set local time** button next to the calendar icon.

To automatically synchronize the time using an NTP server, turn on the **"Use NTP"** option and add an NTP server to the field of the **NTP servers**. Use at least local NTP server if you manage more than one camera and/or use integration via API/HTTP/FTP/etc.

Important!

In the case of the camera being registered to the Intellio server, **do not** use NTP servers.

NTP status shows the current status of each configured NTP server. The color indicates state of the server and the value is the delay until synchronization is performed again.

Color sates are the following:

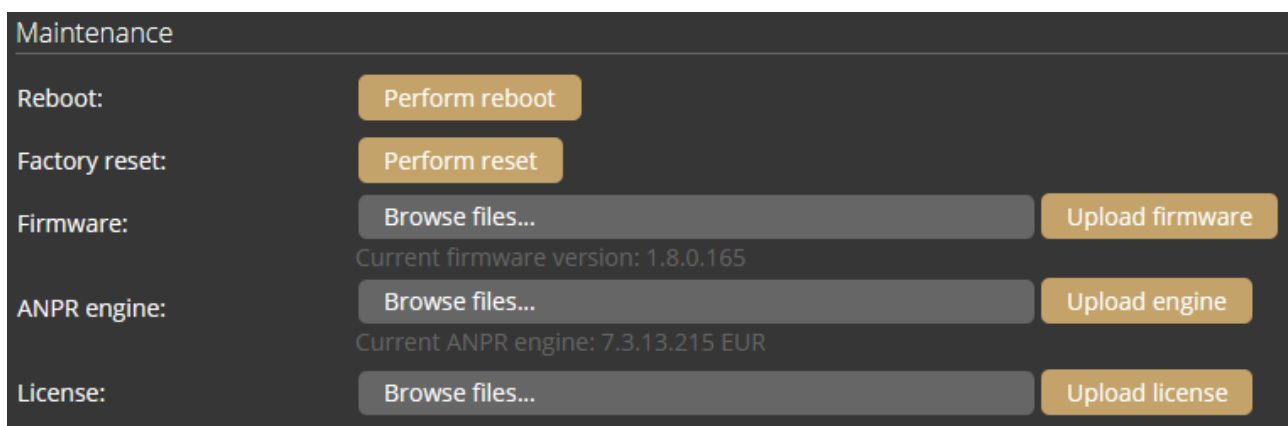
Red: Server is not suitable or unreachable.

Green: Server is working and used for synchronization.

Gray: Server is not used because there is a better alternative.

Firmware, ANPR, License update

Click **[Browse files...]** on the field to be modified, then select the Firmware (.ifw), ANPR (.iep) or License (.ukeys) files to be uploaded. Finally, click on the corresponding upload button.



The update process can be interrupted by clicking on the **[Cancel]** button located on the panel showing the upload status.

When the upload is finished (in the case of uploading license before the update process), the camera asks a security question whether you are sure about the modification. Choosing "No" interrupts the update process, and the camera operates with the previous settings. If you opt for "Yes", the update continues. Updating and rebooting the camera may take a few minutes.

! Important!

During the update process **do not** unplug the camera.

To use the camera with the on-board ANPR function, license file and engine file must be uploaded to the camera.

7.3. SYSTEM / NETWORK

The **Network** menu item hides the network settings. The IP address assigned to the camera can be static or dynamic.

Default DNS: 8.8.8.8

The screenshot displays the network configuration interface. At the top, there are tabs for 'Settings' and 'Monitoring'. Under 'Settings', the 'DNS servers' section contains two input fields with the values '1.1.1.1' and '8.8.8.8', each with a delete icon (X). Below these is an 'Add' button. The 'DNS search domain' section has an 'Add' button. The 'Default interface' section shows a dropdown menu set to 'Wired connection' and a 'Save' button with a checkmark. Below this is the 'Interfaces' section, with a sub-tab for 'Wired connection'. This section shows the 'MAC address' as '00:19:B4:00:D2:23'. The 'Mode' is set to 'DHCP', with 'Static address' also visible. A 'Fallback to static' toggle is currently turned off. To the right, a table shows the 'Current address' and its associated subnet and mode:

Current address	Subnet	Mode
192.168.7.13	255.255.254.0	dhcp
169.254.210.35	255.255.0.0	static

Below the table, the 'Static address' section is visible, with input fields for 'Address' (192.168.2.171), 'Netmask' (255.255.255.0), and 'Gateway' (192.168.2.10). A 'Save' button with a checkmark is at the bottom.

Fallback to static

If the device is set to DHCP, the "**Fallback to static**" option will be accessible. The device will use the configure fallback address when obtaining a new address from a DHCP server fails.

Monitoring

The Monitoring tab shows statistics of active media connections (e.g., live feeds, event stream) and lists all in- and outgoing traffic by network adapter.

The screenshot shows the 'Monitoring' tab with two sections:

Media streams

	Client	Type	Send	Waiting	Dropped	Uptime
	192.168.9.158	RTSP	2.41 Mbit/s	0 B	0 B	7 minutes 4 seconds
	192.168.3.47	IVS	0 bit/s	0 B	0 B	3 minutes 24 seconds
	192.168.3.47	IVS	14.35 Mbit/s	0 B	0 B	3 minutes 24 seconds

Interfaces

Interface	Send	Receive
Wired connection	16.88 Mbit/s	142.32 Kbit/s

7.4. SYSTEM / SECURITY

In the **Users** database, you can perform the maintenance of the user data, like:

- Adding new users
- Deleting users
- Modifying the already existing user profiles

The default user is "**admin.**"

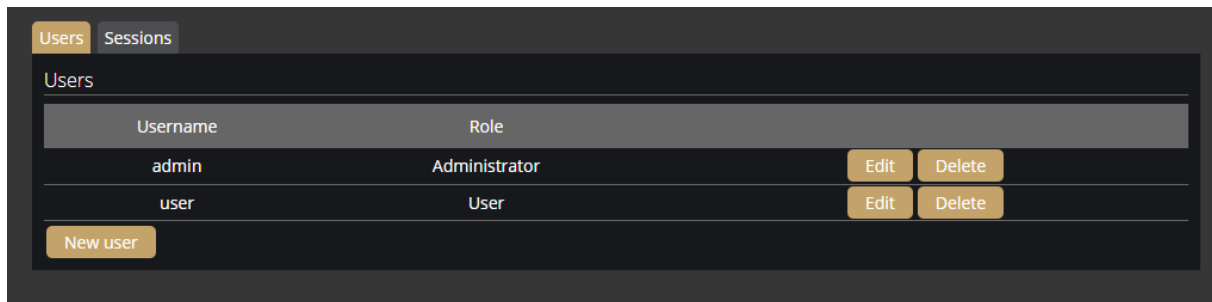
! Important!

To increase the security of using the device on the network, please **change the default password** of your account.

When adding a new user, you can set three levels of permissions:

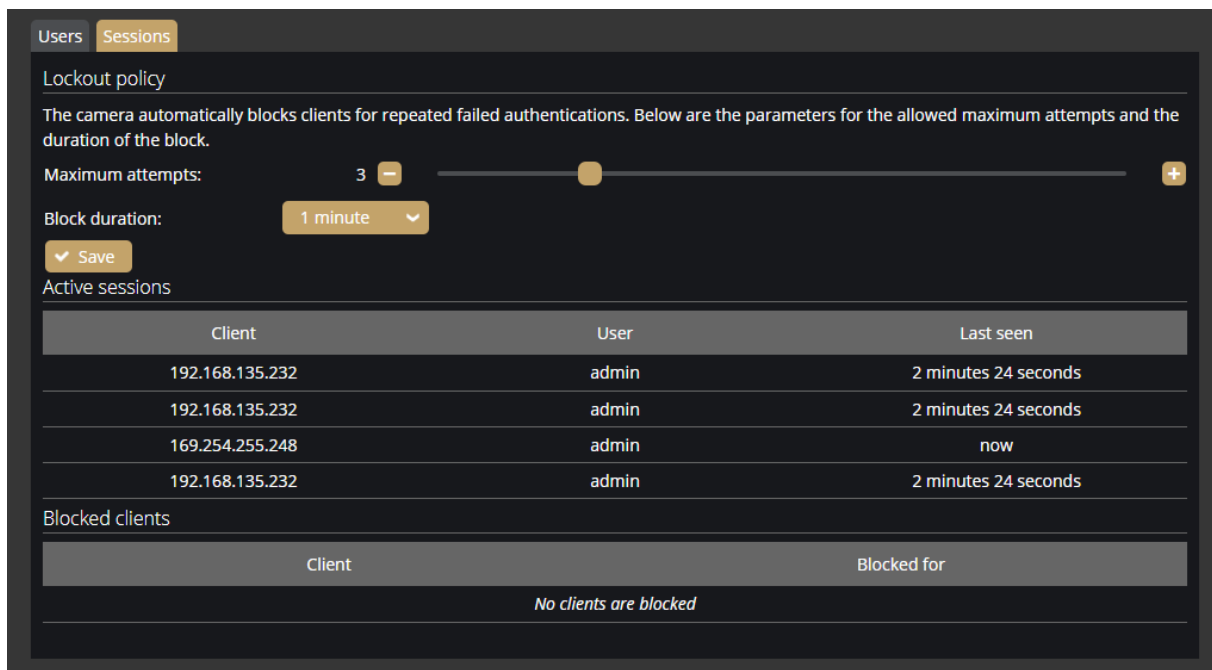
1. **Administrator:** The administrator can access and edit all parameters of a camera.
2. **User:** The user can view but not edit the parameters of the camera. Some pages containing sensitive information may be hidden.

3. **Operator:** The operator has the same privileges as a user but can operate the camera zoom and focus (if available).



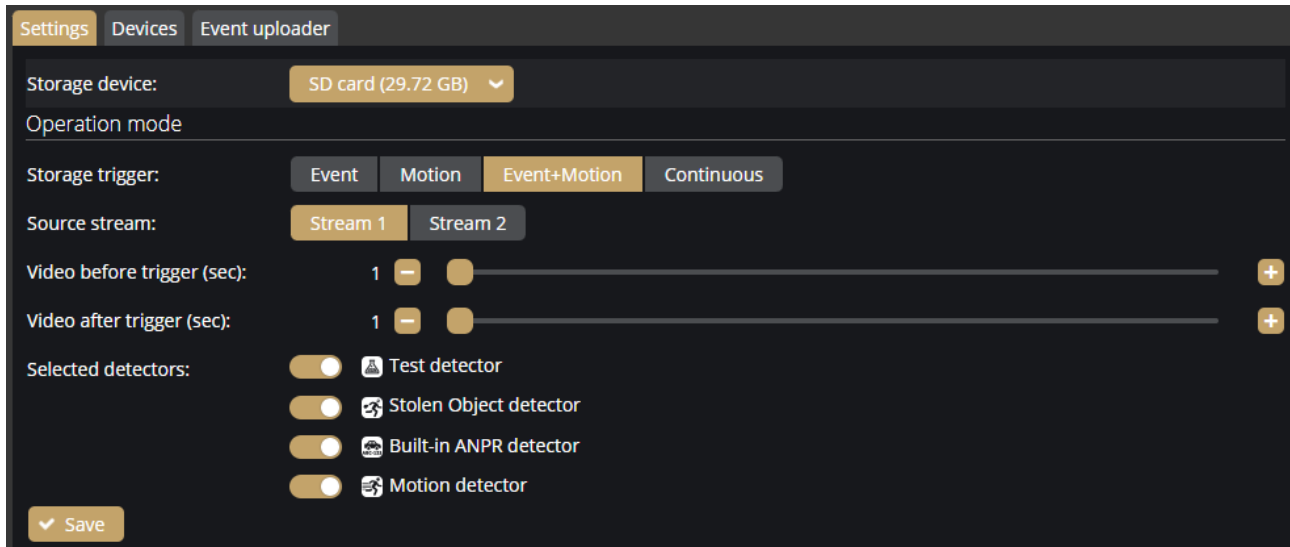
Sessions

At **Lockout policy**, the maximum number of failed login attempts can be adjusted. After reaching the specified number, the device blocks that session. By default, after three failed login attempts, the camera blocks the client for a minute. Note that the number of **Maximum attempts** may vary between one and ten. The duration of the block can be set between 30 seconds and seven days. The Active sessions and Blocked clients can also be seen on this tab.



7.5. SYSTEM / STORAGE

The settings related to the storage can be performed at **Storage**. After enabling the storage function, select a device under **Storage device** where the images, video streams and events are saved.



Operation mode

Under **Operation mode**, the **storage trigger** can be selected. The image sequences will be saved based on this selection.

Important!

These settings only have an impact on the storage device. They do not affect the storage in the IVS.

The following can be selected as a **storage trigger**:

- **Event**: Only those image sequences will be stored which have taken place during the signaling of the selected detector(s).
- **Motion**: When the camera detects motion, the storage process starts and finishes when the motion is over.
- **Event+Motion**: Storage is performed in cases of both an **Event** or **Motion**.
- **Continuous**: The storage function saves every frame regardless of event or motion.

The properties of the video stream to be recorded for an event can be selected by specifying the **Source Stream** parameter. **Stream1** represents the higher resolution, primary stream and **Stream2** represents the lower resolution, secondary stream. See also **{Media / Video}**.

Recordings before and after activation (seconds)

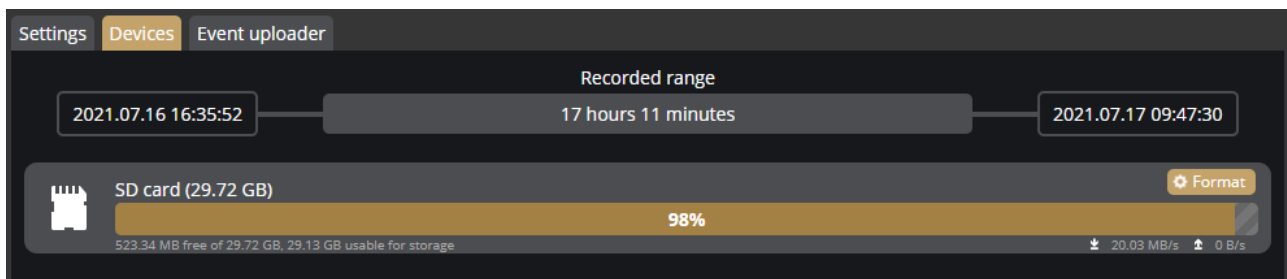
The recording time (in seconds) before and after the events can be regulated with the help of the sliders.

Selected detectors

It may not be necessary to record at every detector signaling. Thus, the user can select which detector signals should trigger the recording.

Devices

Under the **Devices** tab, information about the data of the SD card, the length of the recordings, the available storage, and the writing speed can be found.



Formatting the SD card

With the "**Format**" button, you can format the storage unit immediately. After clicking on the [**Format**] button, a window pops up. Click on the [**Yes**] button to start the operation. The capacity bar indicates the remaining time of the formatting process.

! Important!

The formatting deletes every data from the SD card.

Setting the GDS upload

Enable the upload to the GDS (Globessey Data Server) at "**Upload mode**", then enter the required data to set the GDS server. The microSD card is required for GDS upload to work.

The following fields should be defined:

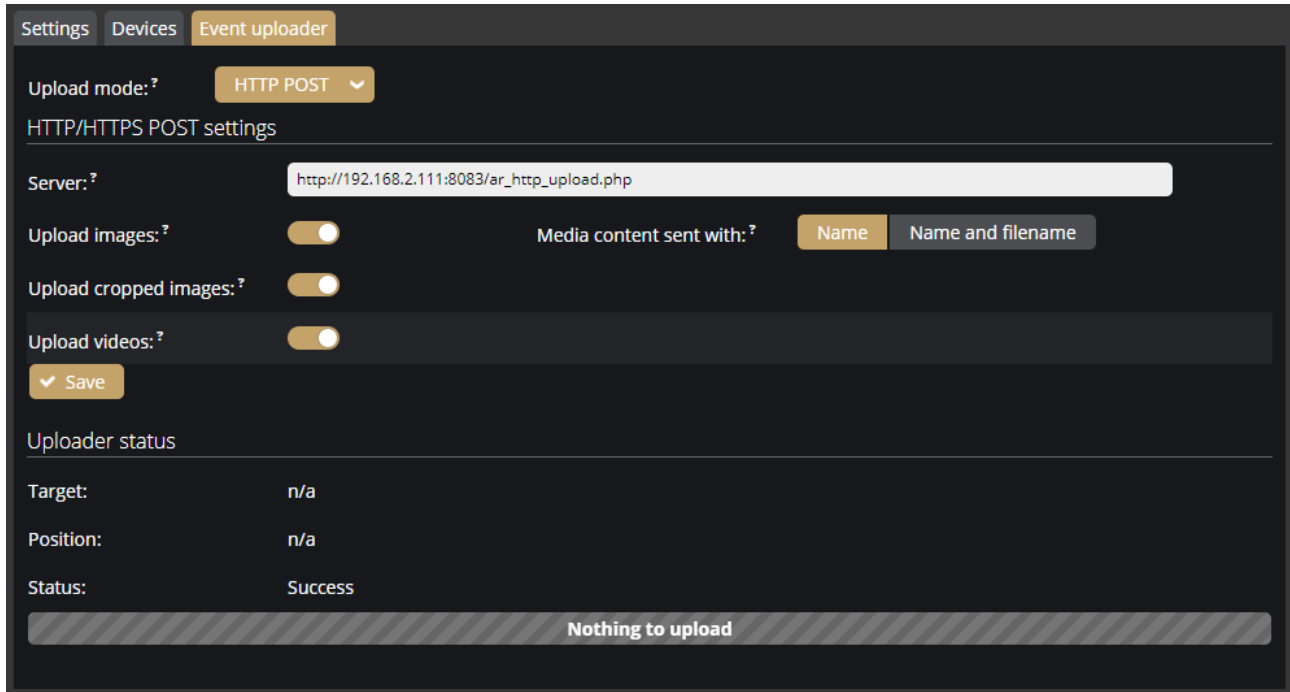
- **Server:** Address (IPv4) of the GDS server
- **Port:** Access port of the GDS server
- **Path:** Access path within the GDS server
- **Table name:** The name of the GDS table where the upload will be done
- **Username:** Username required for the identification
- **Auto obtain user:** The username can be queried automatically. The device queries the user token, which will be the user. However, it has to be authorized manually from the GDS site by a second party.

In the **Uploader status** section, you can view the status and the data of the uploader.

The screenshot shows the 'Event uploader' settings page. At the top, there are tabs for 'Settings', 'Devices', and 'Event uploader'. The 'Upload mode' is set to 'GDS'. Under 'GDS settings', the 'Server' is '192.168.2.196', 'Port' is '8888', 'Path' is empty, 'Username' is 'primula', and 'Table name' is 'multi_event'. The 'Auto obtain user' toggle is turned on. A 'Save' button is visible. Below, the 'Uploader status' section shows 'Target: gds://primula@192.168.2.196:8888/#multi_event', 'Position: n/a', and 'Status: n/a'. A progress bar at the bottom indicates 'Authenticating'.

Setting the HTTP(S) upload

Enable the upload to the HTTP POST at “**Upload mode**”, then enter the full URL of the web service to set the HTTP event receiver. The microSD card is required for HTTP(S) upload to work.



The screenshot shows the 'Event uploader' settings page. At the top, there are tabs for 'Settings', 'Devices', and 'Event uploader'. Below the tabs, the 'Upload mode' is set to 'HTTP POST'. Underneath, the 'HTTP/HTTPS POST settings' section includes a 'Server' field with the URL 'http://192.168.2.111:8083/ar_http_upload.php'. There are three toggle switches: 'Upload images' (checked), 'Upload cropped images' (checked), and 'Upload videos' (checked). To the right of the 'Upload images' toggle is a 'Media content sent with' section with two options: 'Name' (selected) and 'Name and filename'. A 'Save' button is located below the settings. At the bottom, the 'Uploader status' section shows 'Target: n/a', 'Position: n/a', and 'Status: Success'. A large grey bar at the very bottom contains the text 'Nothing to upload'.

You can set which data should be uploaded in addition to the event data:

- Event image
- A cropped image of the license plate
- Video of the event

A basic HTTP server creation script and an example for a HTTP server installation can be found in ATSS.

Setting the FTP upload

Enable the upload to the FTP at "**Upload mode**", then enter the required data to set the FTP upload. The microSD card is required for FTP upload to work.

The following fields should be defined:

- **Protocol:** the services that are supported by the uploader (FTP(ES), FTPS, SFTP) can be selected
- **Server:** IP address (IPv4) or hostname of the FTP server
- **Port:** the service's port where it listens to requests
- **Username/password:** Username and password required for the identification

With the "**Start test**" button you can test the connection between the camera and the FTP server.

In the **Uploader status** section, you can view the status and the data of the uploader.

The screenshot displays the 'Event uploader' configuration page. At the top, there are tabs for 'Settings', 'Devices', and 'Event uploader'. The 'Upload mode' is set to 'FTP'. Under 'FTP settings', the 'Protocol' is 'ftp(es)', 'Server' is '192.168.2.111', and 'Port' is '21'. The 'Path' is 'events/%MAC/%DATE/'. The 'Username' is 'intellio' and the 'Password' is masked with dots. A 'Start test' button is visible. Below the settings is the 'Uploader status' section, which shows the target path 'ftp://192.168.2.111:21/events/02d717/2022-03-20/', the position '2022.03.20 12:17:30', and a status of 'Success'. A progress bar at the bottom indicates 20% completion.

7.6. SYSTEM / IO

The I/O ports allow communication between the information processing system (in this case, the camera) and the outside world (e.g., a person, computers, alarms, barriers, etc.).

The conditions related to the information coming from the outside world to the camera and arriving through the input ports (input signals) can be adjusted by clicking the **[Edit]** button at the **Inputs** tab.

When the **port's active state** is set to "**Low**", the signal is only received from a detector if the device connected to the camera sends about 0-1 VDC. When the **port's active state** is set to "**High**", then the signal is received from a detector if the device connected to the camera sends about 2-24 VDC.

Inputs		Outputs	
Port	Idle state	Active state	
IN_0	Low	High	Edit

You can also modify the **Output ports** at the **Outputs** tab.

The following parameters can be adjusted after clicking on the **Edit** button:

- **Active state:** The active state of the port. If it is "**Open**", the port is open when an event occurs. If it is "**Closed**", the port closes when an event occurs.
- **Impulse length (ms):** In the case of activating the output port, the length of the active state can be adjusted.

Inputs		Outputs	
Port	Idle state	Active state	Impulse length
OUT_0	Open	Closed	500

[Edit](#) [Activate](#)

Trigger configuration

Detectors		OUT_0
	Stolen Object detector	<input type="checkbox"/>
	IO detector	<input type="checkbox"/>
	Test detector	<input type="checkbox"/>
	Built-in ANPR detector	<input checked="" type="checkbox"/>

[Save](#)

It can be selectable which detector signal should activate the output port of the camera at Trigger configuration section.

You can monitor the state changes of the input/output ports at IO log section:

IO log		
15:59:08	OUT_0	OUT_0 has been deactivated
15:59:08	OUT_0	OUT_0 has been activated
19:38:03	OUT_0	OUT_0 has been deactivated
19:38:03	IN_0	IN_0 has been deactivated

7.7. SYSTEM / SERVICE

Webserver

- **Service port / Secure service port:** The service ports of the Webserver can be specified by filling in the field.

RTSP

- **Service port:** The service port of the RTSP can be specified by filling in the field.
- **Authentication required:** By selecting "**Enabled**", authentication is required when connecting to the RTSP stream.

SNMP

- **Service enabled:** The SNMP service can be enabled or disabled.
- **Read community:** Password required for the camera properties on SNMP.
- **MIB** file can be found in ATSS.

UPnP

- **Allow discovery:** Enable or disable the device discovery provided by the UPnP protocol.

IVS

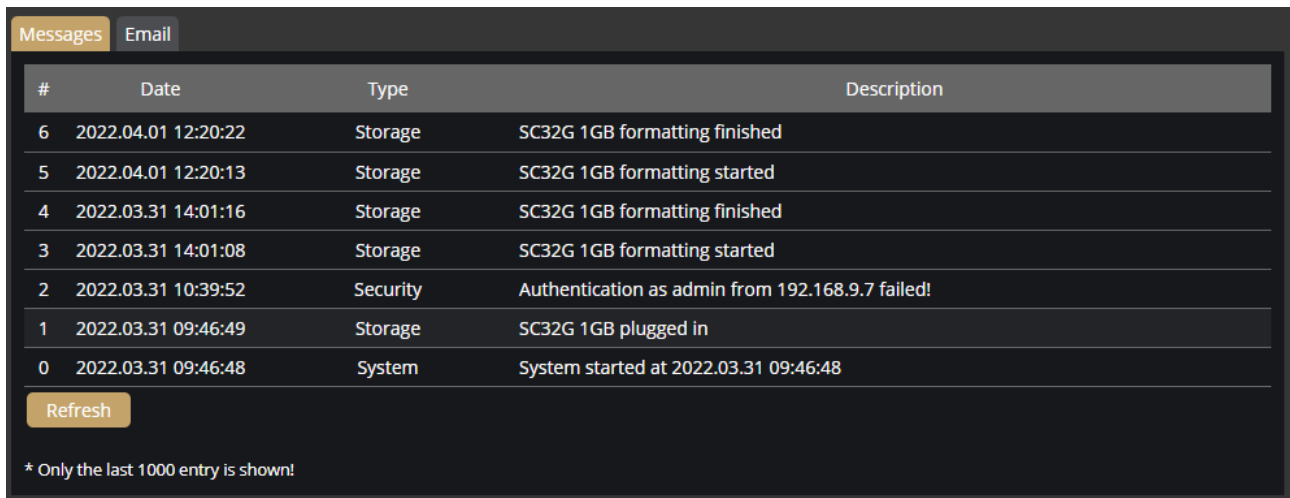
- **Service port:** The service port of the IVS (Intellio Video System) can be specified by filling in the field.

The screenshot shows a configuration interface with a dark background and light text. It is organized into sections for different services, each with its own header and settings:

- Webserver:** Contains two input fields. "Service port" has the value "80". "Secure service port" has the value "443".
- RTSP:** Contains two settings. "Service port" has the value "554". "Authentication required" has two radio buttons: "Disabled" (selected) and "Enabled".
- SNMP:** Contains two settings. "Service enabled" has two radio buttons: "Disabled" (selected) and "Enabled". "Read community" has a password field with six dots.
- UPnP:** Contains one setting. "Allow discovery" has two radio buttons: "Disabled" (selected) and "Enabled".
- IVS:** Contains one input field. "Service port" has the value "53539".

7.8. SYSTEM / NOTIFICATIONS

In the **Messages** tab of this configuration interface, you can find system messages of the camera.



#	Date	Type	Description
6	2022.04.01 12:20:22	Storage	SC32G 1GB formatting finished
5	2022.04.01 12:20:13	Storage	SC32G 1GB formatting started
4	2022.03.31 14:01:16	Storage	SC32G 1GB formatting finished
3	2022.03.31 14:01:08	Storage	SC32G 1GB formatting started
2	2022.03.31 10:39:52	Security	Authentication as admin from 192.168.9.7 failed!
1	2022.03.31 09:46:49	Storage	SC32G 1GB plugged in
0	2022.03.31 09:46:48	System	System started at 2022.03.31 09:46:48

Refresh

* Only the last 1000 entry is shown!

In the **Email** tab, you can specify the email settings for sending messages. The following parameters can be adjusted after clicking on the **Enabled** button:

- **Delay between messages:** After sending an email, the device will wait at least the selected duration before it can send another email.
- **Exclude:** Notification types selected here are excluded from the email messages.
- **SMTP settings:** enter the required data to set the access of the SMTP service.

E-mail settings: set the display name and the email address that the device uses when sending email messages. The "**Send to**" field is used to set the recipients.

Messages **Email**

E-mail notifications: Disabled Enabled

Delay between messages: [?] 10 minutes

Exclude: [?]

- Storage
- NTP
- Security
- System

SMTP settings

Host: smtp.gmail.com

Port: 587

Encryption: STARTTLS/None

Username: te i@gmail.com

Password:

E-mail settings

Sender name: [?] Einar-5T-EntryCam
(e.g.: CAM-Floor3)

Sender address: [?] te: i@gmail.com

Send to:

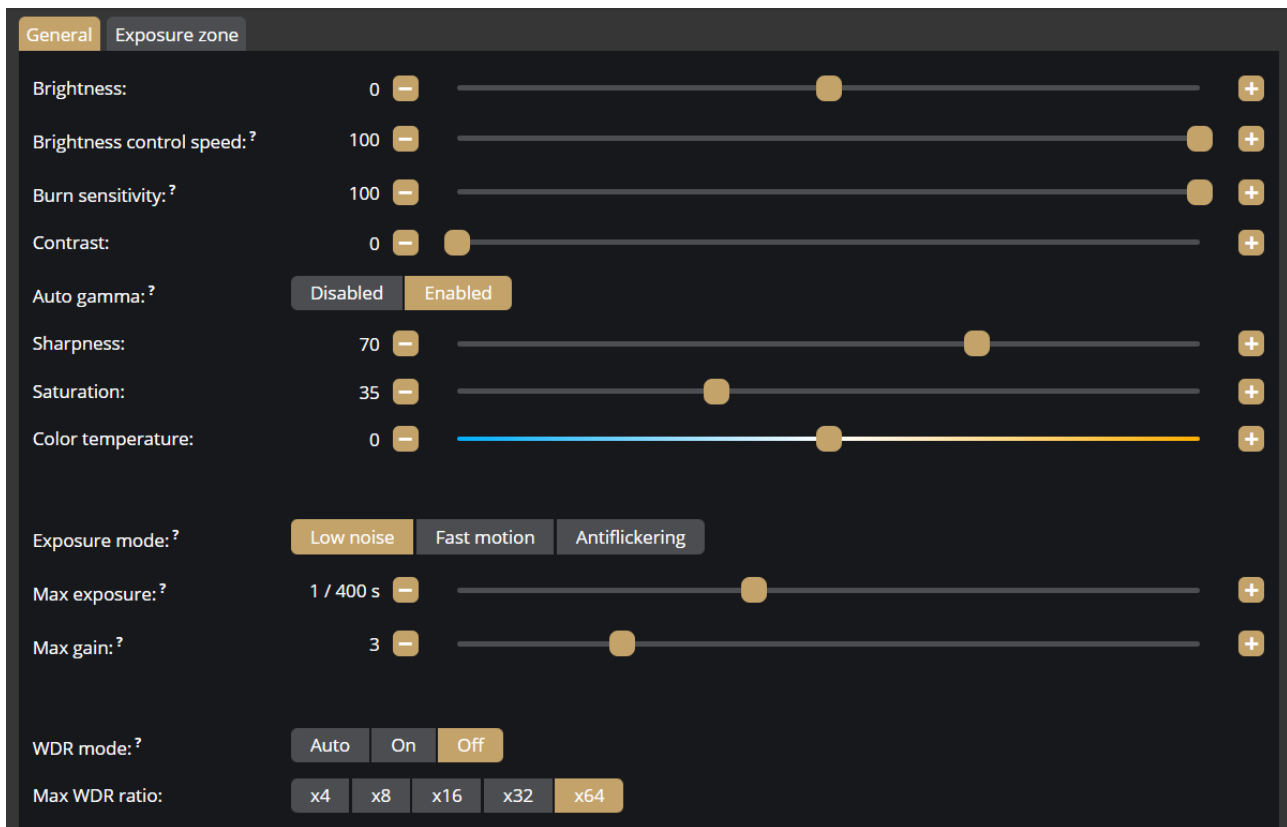
inyi@adaptiveRecognition.com
iho@adaptiveRecognition.com

* One email address per line

7.9. MEDIA / IMAGE

On this configuration interface, you can optimize the image quality.





Here, the following elements can be fine-tuned:

- **Brightness:** It sets the image brightness.
- **Brightness control speed:** It sets the speed of adaptation to the changing lighting conditions (e.g., how quickly the camera can adapt to the new lighting condition if the light is switched on in a dark room). Higher values increase the reaction speed.
- **Burn sensitivity:** The more sensitive this setting is, the fewer burned pixels appear. Note, however, that the image will be darker. (e.g., to compensate for over-illuminated and, therefore, burnt-out number plates)
- **Contrast:** Brightness difference between the brightest and darkest points of the image.
- **Auto gamma:** It increases the contrast on the darker spots of the image so that the details are more visible even in poor lighting conditions.
- **Sharpness:** It makes the details sharper or more blurred.
- **Saturation:** It defines the saturation of colors in the image.
- **Color temperature:** It adjusts the reddish/bluish hue of the image.
- **Exposure mode:** It sets the mode related to the selection of the exposure time.
- **Max exposure:** The camera cannot expose longer than the specified value.
- **Max gain:** The digital gain cannot be greater than the specified value.
- **WDR mode:** With the Wide Dynamic Range function, you can achieve better image quality if the camera image contains both heavily burned and dark spots. The WDR function can be turned on/off or set to automatic.

- **Max WDR ratio:** The WDR merges two images. One of the images adjusts the exposure time to the brighter and the other to the darker spots. Therefore, combining the two images results in fewer burned bright spots and more visible dark spots. The Max WDR ratio adjusts the maximum overlap of the two images.
- **Day/night mode:** Day and night mode can be chosen manually or automatically.
- **Day/night preference:** A preferred setting of day or night mode can be defined, which is applied in the case of automatic shifting.
- **2D noise filter:** Noisy pixels are filtered based on the environment of a pixel.
- **3D noise filter:** The deviation of the same pixels of frames in the sequence determines if the image is noisy.
- **Iris control:** The iris can be kept open all the time or can be operated automatically.
- **Infra LED mode:** The infra LED can be operated automatically or can be disabled.
- **Infra LED power:** You can adjust the brightness of the infra LED.
- **Power line frequency:** The power line frequency of the region where the camera is installed. It is used to eliminate vertical flickering in artificially lit areas.
- **Horizontal flip:** Flips the image horizontally when enabled.
- **Vertical flip:** Flips the image vertically when enabled.



WDR mode: ?

Max WDR ratio:

Day/night mode:

◀ Night Day ☀

Day/night preference: -85

3D noise filter: ?

Iris control: ?

Infra LED mode: ?

Infra LED power: 50

Horizontal flip:

Vertical flip:

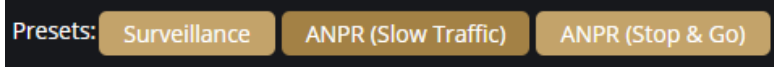
Presets:

Presets

You can select preset values which are calibrated to different situations. These elements are not necessarily ideal settings for all cases; they are to be considered as guidelines. They generally show acceptable image settings for certain scenarios.

These preset values are the following:

- **Surveillance:** General setting for basic motion detection and surveillance
- **ANPR (Slow Traffic):** Ideal for free-flow, slow traffic license plate reading
- **ANPR (Stop & Go):** Recommended for parking license plate reading



Presets: Surveillance ANPR (Slow Traffic) ANPR (Stop & Go)

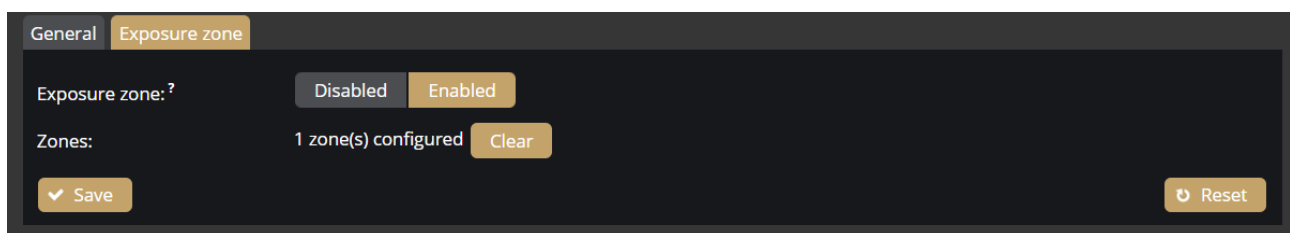
Preset buttons show if current settings match a preset.

Note

If the camera is included with on-board ANPR engine and your project does not involve parking, use Slow Traffic values.

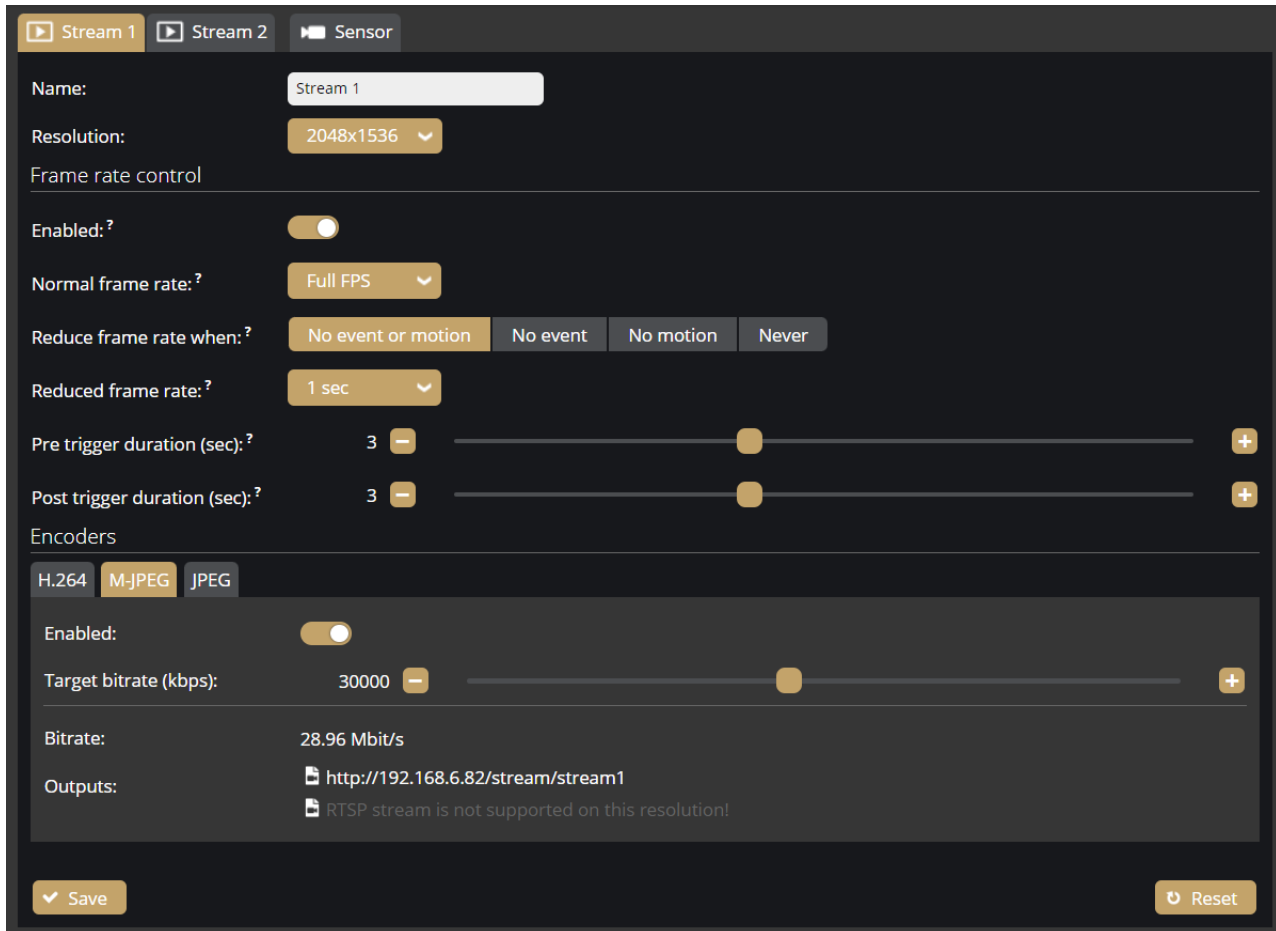
Exposure Zone

The Exposure Zone tab allows you to draw and enable the zone(s) the image control is based on using polygons. If the area outside the expected area of license plate reading is disturbed or has an entirely different illumination and brightness, you may mask the area for license plate reading to balance the image control.



7.10. MEDIA / VIDEO

When clicking on the **Video** menu item, the functions related to the video encoders are displayed. Above these, the live stream of the camera remains visible.



On this interface, the settings (name, resolution, frame rate, etc.) of **Stream 1** and **Stream 2** can be performed separately.

Frame rate control

It can be enabled or disabled. When it is disabled, the camera operates with maximum FPS regardless of the other settings located on this interface. After enabling it, the following functions can be set:

- **Normal frame rate:** The frame rate of the camera in normal state
- **Reduce frame rate when:** The FPS can be set to be reduced upon Motion (exclusively), Event (exclusively), Motion or Event, or Never
- **Reduced frame rate:** Rate of the reduced frame rate
- **Pre trigger duration:** The length of the stored recordings before the events can be specified
- **Post trigger duration:** The length of the stored recordings after the events can be specified

Encoders

You can adjust the **H.264** and the **MJPEG** versions of the streams separately, alongside defining the quality of the thumbnail images.

- **Target bitrate (kbps):** The bandwidth size can be adjusted.
- **I-frame interval (GOP):** The density of the I frames can be specified.
- **Quality:** The quality of the images can be specified.

Note

The values to be set alternate stream by stream.

MJPEG streams can be enabled or disabled separately.

Videostream / image URL links can be found on this interface:

Stream1 / H.264 stream: `rtsp://EINAR_IP:554/stream/stream1`

Stream1 / MJPEG stream: `http://EINAR_IP/stream/stream1`

Stream1 / JPEG image: `http://EINAR_IP/image/stream1`

Stream2 / H.264 stream: `rtsp://EINAR_IP:554/stream/stream2`

Stream2 / MJPEG stream: `http://EINAR_IP/stream/stream2`

Stream2 / MJPEG stream: `rtsp://EINAR_IP:554/stream/stream2/mjpeg`

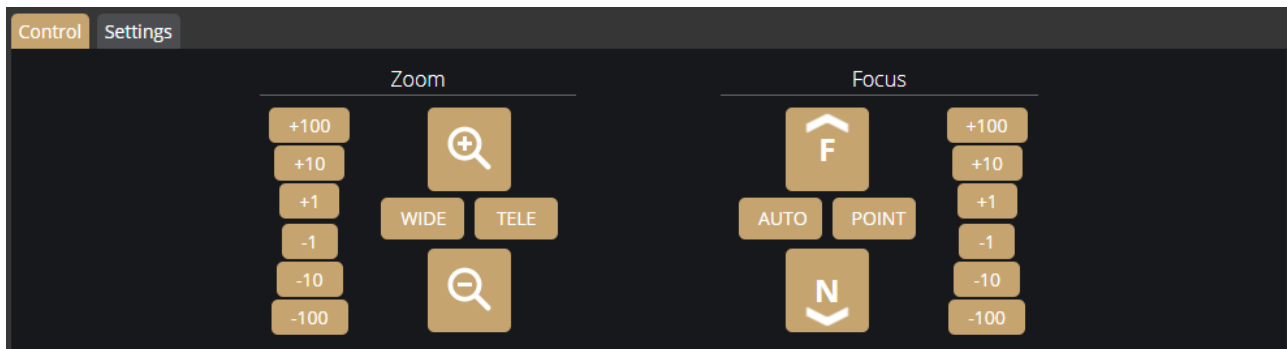
Stream2 / JPEG image: `http://EINAR_IP/image/stream2`

Sensor

Under the **Sensor** tab, you can adjust the aspect ratio to 4:3 or 16:9.

7.11. MEDIA / LENS

On this interface, you can fine-tune the lens of the device: the **Focus** and the **Zoom** can be customized by using the corresponding buttons. See also **{Zoom & Focus}**.



WIDE / TELE buttons: the lens can be adjusted to the end position using these buttons.

Press and hold the **+** (magnifying glass with + sign) and **-** (magnifying glass with - sign) buttons to decrease or increase the camera's angle of view. The speed of adjustment increases proportionally to the time the buttons are held down.

Press and hold the **F** (Far) and **N** (Near) buttons to set the focus to Far and Near, respectively. The speed of adjustment increases proportionally to the time the buttons are held down.

The **+100/+10/+1/-1/-10/-100** buttons move the lens in the given direction by the given number of units.

The camera possesses autofocus. The autofocus function is enabled by default, but it can be disabled on the **Settings** tab with the **"Focus on zoom"** option. If it is enabled, the camera starts to look for the correct focus value by itself to achieve the sharpest image possible. This process begins simultaneously with the zooming.

In the manual, disabled state, the autofocus can be initiated with the **"AUTO"** button in the **Focus** section.

With the **POINT** button you can select a specific point of the image what you want to be the sharpest region in the picture.

Settings / Lens correction: This setting can correct lens distortion occurring at specific zoom settings.

7.12. ANALYTICS / SETTINGS

Settings

You can use the Settings tab to set the resolution and quality of the images – specified in Stream1 or Stream2 **{MEDIA / Video}** – to be assigned to events when uploading via API, GDS or HTTP.



Status

The registered detectors' names, type, ID and status are displayed on the page alongside the list of detectors supported by the camera and their current/total quantity.

Detector	Type	ID	State
Test detector	Test detector	{459BD3EE-A61A-4B42-3C74-DD2CB954D62F}	✓
Stolen Object detector	Stolen object detector	{3E5BC0A6-A65A-4E56-DFFA-9B4D13816E4A}	✓
Built-in ANPR detector	ANPR detector	{8547C029-DCBD-EB4E-B9A0-EB4ACAC58D5B}	✓
Motion detector	Motion detector	{526DC4D9-D1E5-48A8-E8C0-3BEDD16CFCB5}	✓

Type	Currently active	Maximum supported
Test detector	1	16
IO detector	0	1
Stolen object detector	1	16
Motion detector	1	16
ANPR detector	1	16

7.13. ANALYTICS / DETECTORS

You can add, modify or delete the camera detectors in this window.

The list of detectors differs by camera type except for Motion engine, which can be found on all types.

7.13.1. Motion engine and general use of masks

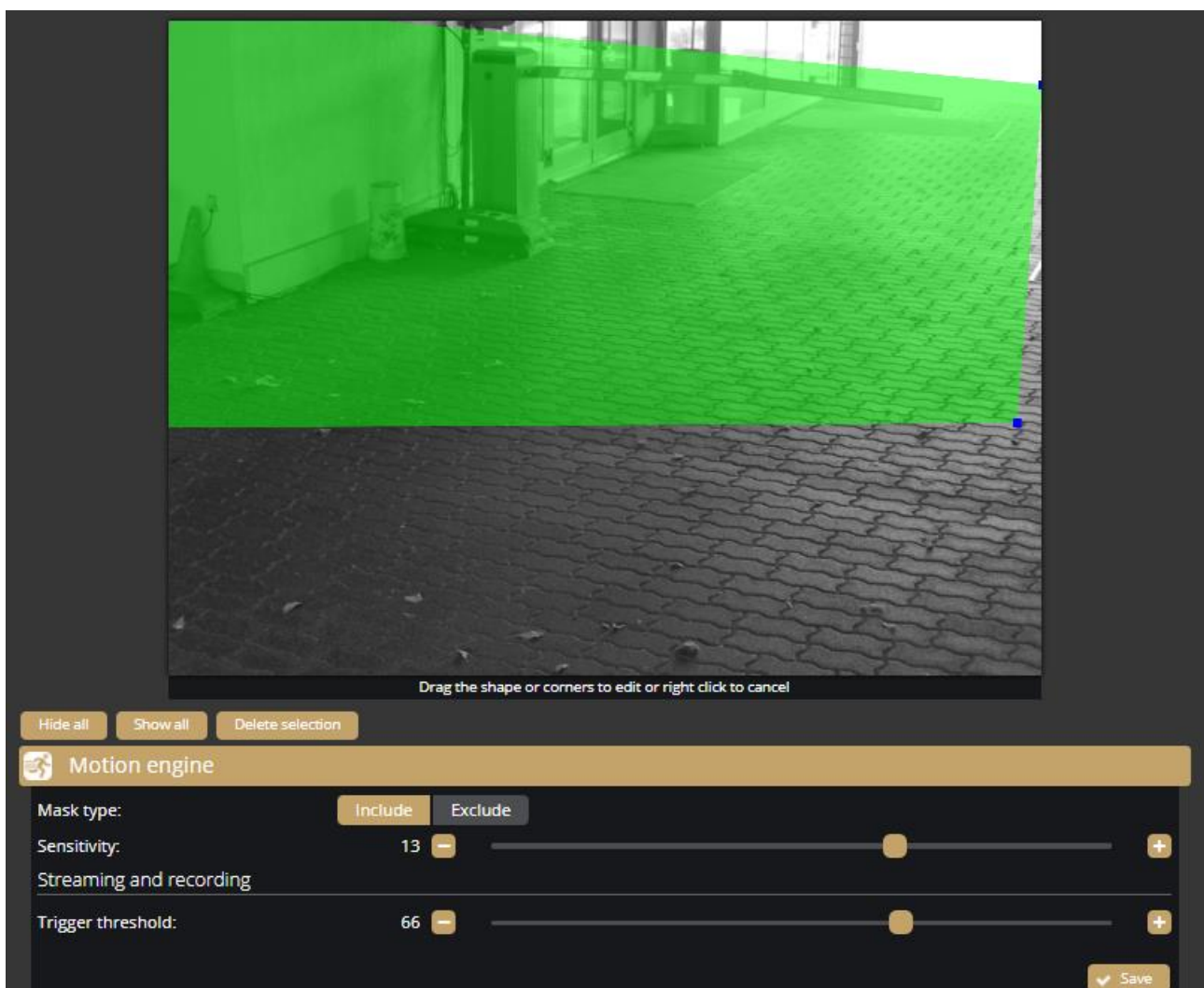
The Motion engine is a fundamental engine that regulates motion-based storage. It cannot be deleted.

 Note

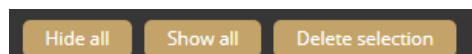
The Motion engine does not induce events; it is responsible for the setting of the motion-based recordings. As such, it can be found on all camera types.

If you click on the engine, a mask can be applied to the live stream. This can be set to exclusive or inclusive with the "**Masks Type**" option. If the mask is set to "Include", the engine will only trigger when motion happens inside the selected area. When it is set to "Exclude", it will not trigger inside the area.

The mask can be modified by clicking on the green area.

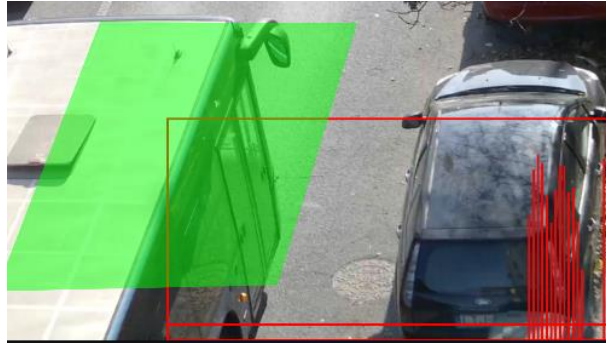


The mask can be deleted by clicking on the [**Delete selection**] button located under the live stream:



Sensitivity: It sets the sensitivity of the motion engine.

Trigger threshold: You can use it to define the sufficient level of motion in the image to trigger the motion engine. Further filtering can be done with the previously set sensitivity conditions to determine the degree of action intensity triggering recording. The "motion diagram" is the OSD belonging to the setting, which can provide visual assistance. See also **{Overlay}**.



7.13.2. Motion detector

The Motion detector can be used to create events based on Motion engine. The following can be adjusted on the Motion detector interface:

- **Name:** The name of the detector can be entered.
- **Description:** To add a brief description to the detector.
- **Trigger threshold:** You can use it to define the sufficient level of motion in the image to trigger the motion detector.

A screenshot of a web-based configuration interface for a "Motion detector". The interface has a dark background with light-colored text and controls. At the top left, there is a "Motion detector" title and a "Motion" button. Below the title, there are three input fields: "Name:" with the value "Motion detector", "Description:" with the value "Signals on any movement in the selected area", and "Trigger threshold:" with a slider set to 50. At the bottom right, there are three buttons: "Save", "Disable", and "Delete".

ANPR detector and ANPR engine

The ANPR detector and the ANPR engine jointly perform the reading of license plates.

! Important!

Both the detector and the engine must be present on the camera to operate the system. They are only available for cameras designed to read license plates.

7.13.3. ANPR engine

You can choose between the Onboard ANPR Engine running on the camera or the Carmen Cloud service for license plate recognition.

You can create a mask on the image, after which license plates will be detected only in the selected area. It is recommended to select the area where license plates are expected to appear on the image. The expected area of license plates can be plotted on the image with a polygon that contains a given number of vertices.

! Important!

Although the ANPR engine recognizes the license plates in the image, to make it work properly, the area around the license plate must be visible (front or rear of the vehicle).

In the case of **Onboard ANPR**, you can adjust the primary functions of the ANPR engine. The parameters that can be set vary depending on the engine:

- **Engine:** It shows the current ANPR engine version and region.
- **Minimum confidence:** Use the slider to define what reading confidence percentage should trigger an event. A low value potentially results in more reading errors. A high value potentially leads to missed reading cases. Therefore, values between **50-70%** are recommended. Check the "ANPR Status" OSD layer to see the detected license plate numbers and their confidence values and then set the desired minimum confidence level based on the results. See also **{Overlay}**.
- **Ignore same plate for (s):** Set a time limit for previously-read license plates. This value determines a waiting time in seconds before the same license plate is read again.
- **Color recognition:** When color recognition is active, the device will attempt to identify the plate colors. This may slow down the speed of recognition.

- **Country preference:** The selected region is prioritized and read with a higher confidence value by the license plate reading system. In comparison, license plates from other regions are managed with a lower confidence value.
- **Traffic type:** Type of traffic the device processes. Some engines contain more than one recognition possibility. If the uploaded engine supports „Quick” recognition mode, you can select it as „SlowTraffic” mode.

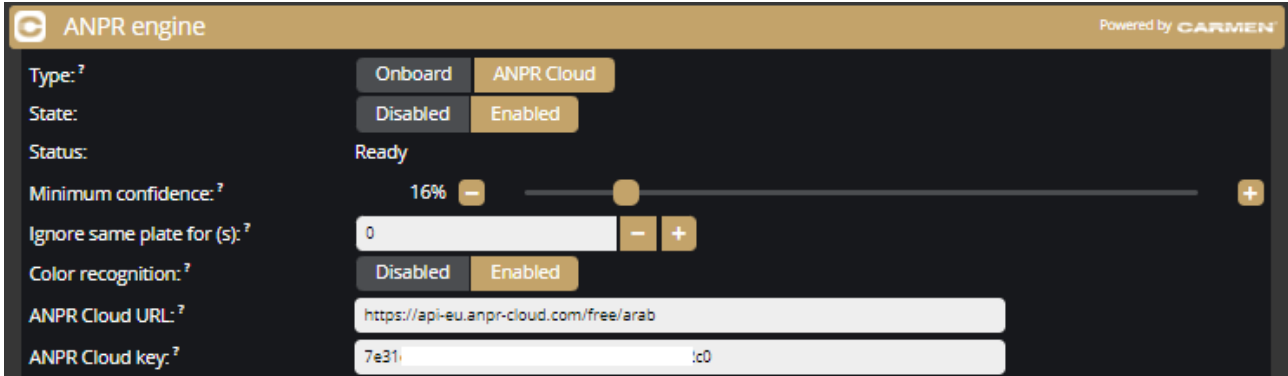
In the case of **Carmen Cloud**, the license plate recognition is not processed in the camera. Instead, images with license plates are selected in the camera and sent to the engine in the cloud for license plate recognition. A stable internet connection and a Carmen Cloud subscription are required for the license plate recognition to work in the cloud. For more information about Carmen Cloud, visit <https://adaptiverecognition.com/anpr-cloud/>.

You need to adjust the following parameters. The parameters that can be set vary depending on the engine:

- **State:** You can enable or disable the ANPR engine to send license plate images to ANPR Cloud.
- **Minimum confidence:** Use the slider to define what reading confidence percentage should trigger an event. A low value potentially results in more reading errors. A high value potentially leads to missed reading cases. Therefore, values between **50-70%** are recommended. Check the "ANPR Status" OSD layer to see the detected license plate numbers and their confidence values and set the desired minimum confidence level based on the results. See also **{Overlay}**.
- **Ignore same plate for (s):** A time limit can be set for previously-read license plates. This value determines a waiting time in seconds before the same license plate is read again.

- **Color recognition:** When color recognition is active, the device will attempt to identify the plate colors.
- **ANPR Cloud URL:** Paste the URL you received when subscribing to the field.
- **ANPR Cloud key:** Enter the individual key of the subscription.

The **Status** field displays information about the operation of Carmen Cloud, e.g., successful/failed connection, upload status, expired credits, etc.

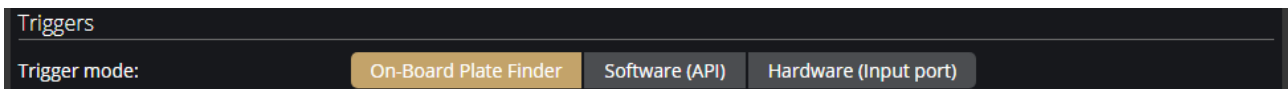


Trigger modes

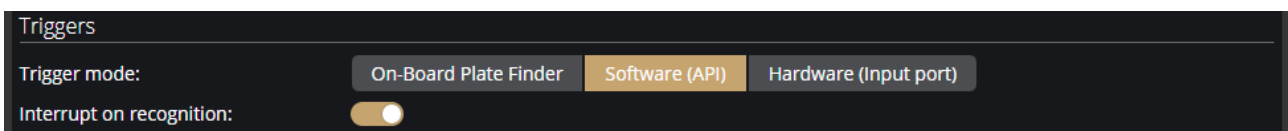
By default the engine uses the on-board license plate finder to search for possible license plate locations before trying to detect license plates. This behaviour can be changed to use external triggers by configuring the **Trigger Mode** option.

Available trigger modes are:

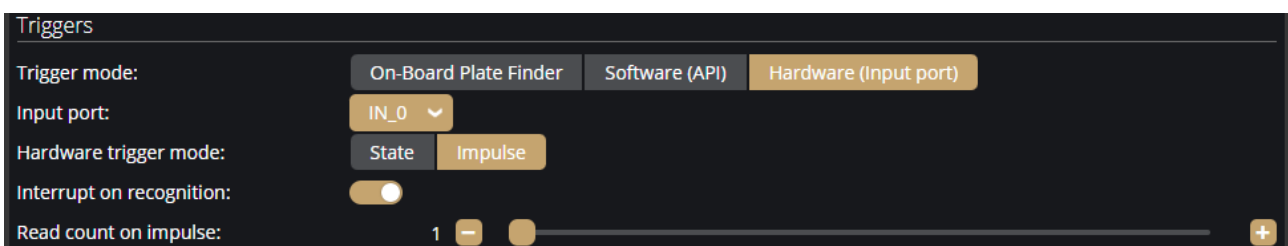
On-board Plate Finder: Engine is triggered automatically by the on-board license plate finder



Software (API): Engine can only be triggered using an API call (Analytics/TriggerEngine). See also the API documentation **{System / Status}**



Hardware (Input port): Engine is triggered by a configured GPIO input port. See also **{System / IO}**



Hardware trigger mode: If **State** is selected the camera continuously processes images and searches license plates while the input port is active.

Read count on impulse: When using hardware trigger in Impulse mode, the engine reads license plates until the specified count is reached.

Interrupt on recognition: When this option is selected, the camera aborts further readings after recognizing successfully the first license plate.

7.13.4. ANPR detector

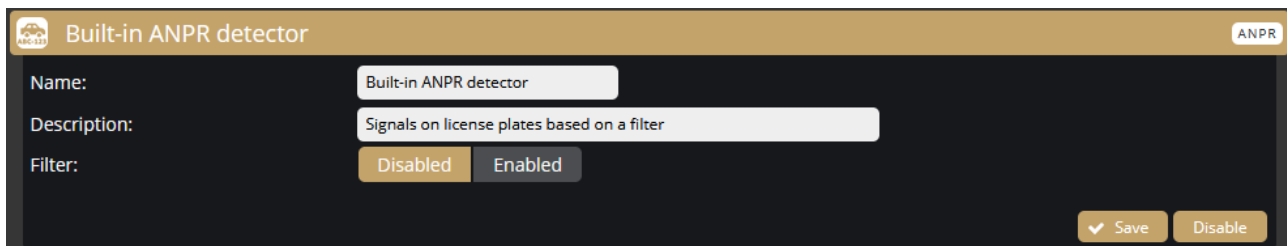
The ANPR detector is responsible for transmitting the events. A factory-set and non-erasable detector, the Built-in ANPR detector, is always present in the camera and generates the events of the license plate numbers detected by the ANPR Engine as soon as the camera is switched on.

! Important!

The ANPR detector must be defined separately. The primary functions of the detector cannot be set under the **ANPR detector** section, but on the interface of the **ANPR engine**.

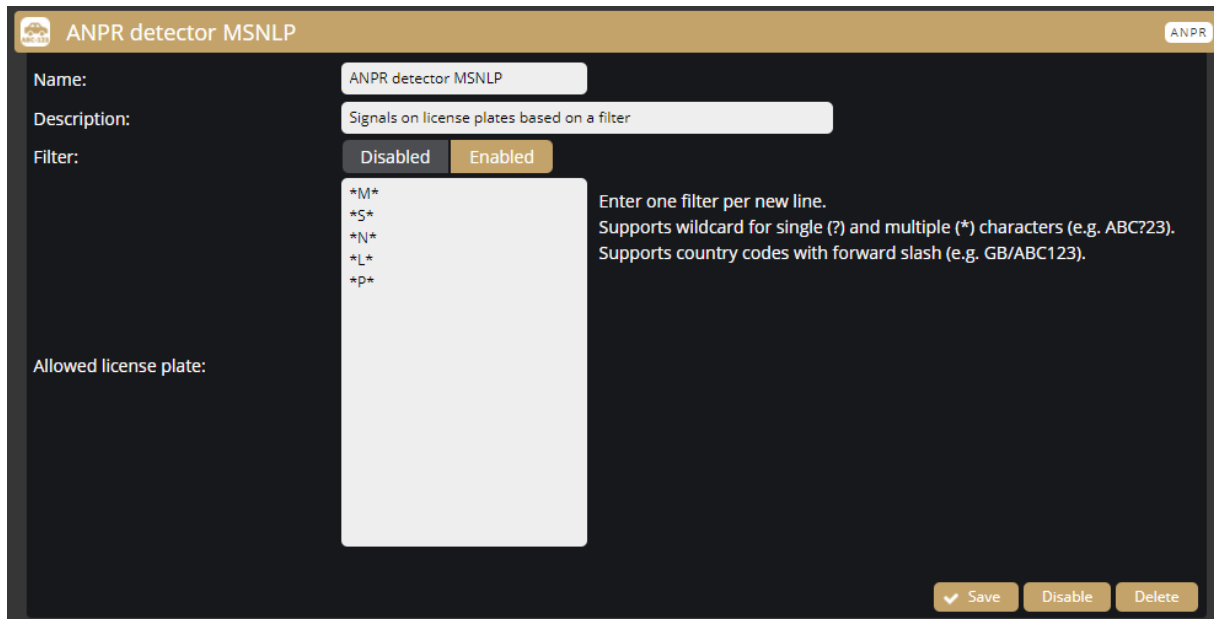
The following can be adjusted on the **ANPR detector** interface:

- **Name:** The name of the detector can be entered.
- **Description:** To add a brief description to the detector.
- **Filter:** The system can be set only to read certain license plates.



The screenshot shows the configuration interface for the 'Built-in ANPR detector'. The title bar includes a logo and the text 'Built-in ANPR detector' and 'ANPR'. The main area contains three fields: 'Name' with the value 'Built-in ANPR detector', 'Description' with the value 'Signals on license plates based on a filter', and 'Filter' with two buttons: 'Disabled' (selected) and 'Enabled'. At the bottom right, there are two buttons: 'Save' and 'Disable'.

You can create additional ANPR detectors in addition to the Built-in ANPR detector. For example, by enabling filters and adding license plates to them, you can activate different detectors when certain license plates are detected, thus affecting the storage of the given group, the detector's manageability and also to control the output port. In the example below, the „ANPR detector MSNLP” is triggered if a license plate containing M, S, N, L or P characters are detected.



The screenshot shows a configuration window titled "ANPR detector MSNLP" with a sub-header "ANPR". The interface includes the following fields and controls:

- Name:** ANPR detector MSNLP
- Description:** Signals on license plates based on a filter
- Filter:** A toggle switch is set to "Enabled". Below it is a text area containing the following filter rules:

```
*M*
*S*
*N*
*L*
*P*
```
- Allowed license plate:** An empty text area.
- Instructions:** "Enter one filter per new line. Supports wildcard for single (?) and multiple (*) characters (e.g. ABC?23). Supports country codes with forward slash (e.g. GB/ABC123)."
- Buttons:** "Save", "Disable", and "Delete" are located at the bottom right.

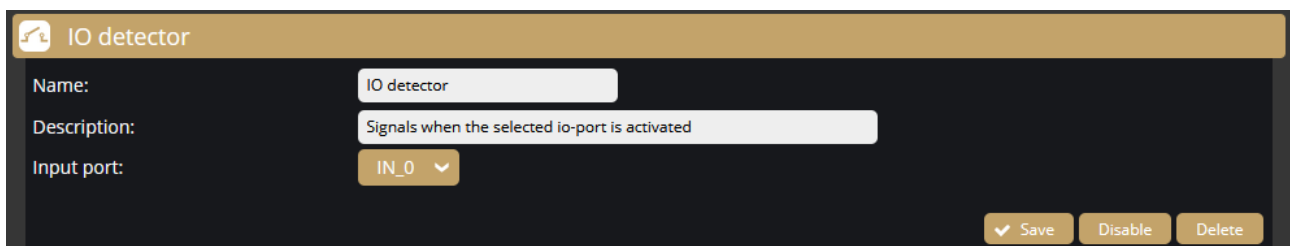
If you want to open a barrier when the above characters are detected, you have to enable the output port with the above detector in System / I/O menu at Trigger configuration section **{System / IO}**.

7.13.5. IO detector

The IO detector detects a signal at the camera contact input and, thus, an event is generated when the input is activated. Note that no license plate recognition is performed when the input is activated.

You can adjust the following on the **IO detector** interface:

- **Name:** To enter the name of the detector.
- **Description:** A brief description can be added to the detector.
- **Input port:** The input receiving the signal must be selected. Currently, "IN_0" is the only available input on the camera.



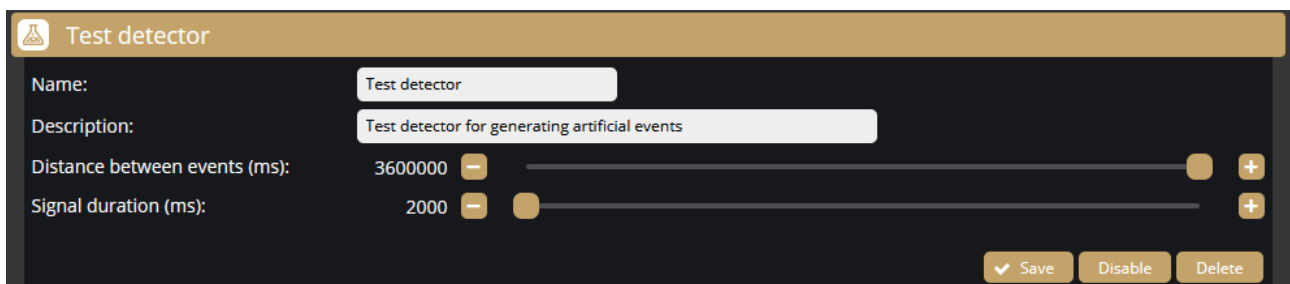
The screenshot shows the 'IO detector' configuration interface. It has a title bar with a camera icon and the text 'IO detector'. Below the title bar, there are three input fields: 'Name:' with the value 'IO detector', 'Description:' with the value 'Signals when the selected io-port is activated', and 'Input port:' with a dropdown menu showing 'IN_0'. At the bottom right, there are three buttons: 'Save', 'Disable', and 'Delete'.

7.13.6. Test detector

The Test detector can be used to test the camera's upload and storage capabilities. Important: use it for testing purposes only.

The following can be adjusted on the **Test detector** interface:

- **Name:** The name of the detector can be entered.
- **Description:** A brief description can be added to the detector.
- **Distance between events:** The camera produces a test event at the set intervals.
- **Signal duration:** To adjust the signal length.



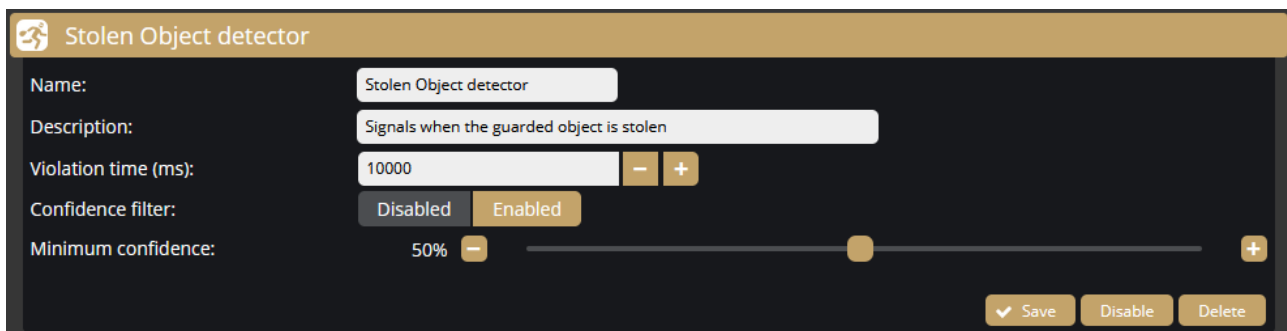
The screenshot shows the 'Test detector' configuration interface. It has a title bar with a test tube icon and the text 'Test detector'. Below the title bar, there are three input fields: 'Name:' with the value 'Test detector', 'Description:' with the value 'Test detector for generating artificial events', and two sliders: 'Distance between events (ms):' with a value of 3600000 and 'Signal duration (ms):' with a value of 2000. At the bottom right, there are three buttons: 'Save', 'Disable', and 'Delete'.

7.13.7. Stolen Object detector

This detector can be used to trigger an event when an object to be monitored moves. In addition to the settings below, you also need to mask the object in the image. The mask should surround the object to be monitored in such a way it slightly overlaps it.

The following can be adjusted on the **Stolen Object detector** interface:

- **Name:** Enter the name of the detector.
- **Description:** Add a brief description to the detector.
- **Violation time:** No signal is given if there is a change within the set time.
- **Confidence filter:** Set the "sensitivity" of the object monitoring.



The screenshot shows the configuration interface for the 'Stolen Object detector'. The interface has a dark background with light-colored text and controls. At the top, there is a header with a small icon and the text 'Stolen Object detector'. Below this, there are five rows of configuration options:

- Name:** A text input field containing 'Stolen Object detector'.
- Description:** A text input field containing 'Signals when the guarded object is stolen'.
- Violation time (ms):** A numeric input field containing '10000', with minus and plus buttons on the right.
- Confidence filter:** Two radio buttons, 'Disabled' and 'Enabled', with 'Enabled' selected.
- Minimum confidence:** A slider control showing '50%' with minus and plus buttons on either side.

At the bottom right of the interface, there are three buttons: 'Save' (with a dropdown arrow), 'Disable', and 'Delete'.

8. HOW TO USE THE EINAR CAMERA

This chapter gives you a quick overview of using Einar and what to look out for when installing and operating the camera.

8.1. CAMERA INSTALLATION

1. Mount the camera as follows (Please also refer to the **Einar Install Guide** on <http://doc.arh.hu/cameras/>) :
 - a. If you want to store events in the camera, **insert the microSD card**.
 - b. If you want to use the camera's input and output, mount the **GPIO cable kit** to the camera.
 - c. For communication with the camera, use at least **Cat5E** outdoor shielded cable.
 - d. Use a **PoE+** rated PoE power adapter or a switch output capable of PoE+. If neither is available, you can also power the camera with 48V DC.
 - e. **Mount/secure the camera firmly** in its intended location.
 - f. **Ground the camera**, preferably using the grounding point on the camera, or at least using an FTP cable grounded at the PoE power supply end – e.g., switch – but take care not to create a ground loop.
 - g. The maximum angle of rotation and/or tilt of the camera should not exceed **25–30 degrees**.
 - h. The optical axis of the camera should **face the license plate** of the oncoming or departing vehicle. The camera's optical axis shall be as small an angle as possible with the axis of travel of passing vehicles.
 - i. The camera should be **at least one meter above the headlights** of vehicles. If possible, it should not be accessible without an assistive device. If the camera is mounted completely unprotected outdoors, it is recommended to mount it higher to minimize the risk of water falling on the front of the camera when raining.
 - j. Use **the waterproofing cap** that protects the RJ45 connector included in the package. Note that the cap must be fitted to the cable before the RJ45 plug is installed.
 - k. In the image, **the license plate should be horizontal**. In extreme cases, it may be necessary to turn the mounting bracket.
 - l. Adjust the camera lens angle of view so that the characters on the license plate are **at least 25 pixels high**. Consider whether you want to recognize license plates with small character sizes. For example, the characters on Italian license plates are smaller than those of countries geographically further north. The easiest way to check the

- character size of a license plate is to display the "ANPR Status" OSD layer in Live View and look at the "**Avg. char height:**" to see the character size **{Overlay}**.
- m. Use **real, moving vehicle(s)** to test the settings; it's not enough to just show a plain license plate in front of the camera.
 - n. Adjust the camera's direction and angle of view to make the license plate visible for **at least one, but preferably two seconds** with the right character size.
2. **Find the camera on the network**, then access the camera's web interface
 - a. From the MAC address of the camera, you can calculate the **IP address that is always available**. It is always in the format **169.254.aa.bb**, where the number aa/bb is the decimal value of the last two pairs of numbers in the MAC address **{Link-Local IP Address}**. However, if a DHCP server is available on the network, the camera will also get an IP address from the DHCP server. You can access the camera from both IP addresses.
 - b. Optionally, you can use the **AR Device Tool** to locate the camera on your local network. **{AR Device Tool}**.
 - c. You can access the camera's web interface with the **admin/admin** username/password pair. It is strongly recommended to change the default password.
 3. Some simple but important basic settings:
 - a. Upload the **ANPR Engine and License Key** to your camera **{System / Device}** according to the email received when you purchased the camera. Check the ANPR Engine quarterly to ensure that the camera is always running with the latest version of the engine. You will also need to update the License Key for updates after a year. You need to see in the **{System / Status}** menu that your License key is present („License key: CARMEN SPI – xxxxxx”) and your licence corresponds to the desired region (push the „ANPR License button” and the popup window shows the region and the validity time of the license).
 - b. Check that the **camera has the latest firmware**. You can download the latest FW from ATSS. Upload it in **{System / Device}** menu.
 - c. **Check/set the camera time {System / Device}**. Use at least a local NTP server.
 - d. If you haven't already done so, adjust the camera **angle of view** and take into consideration the character sizes as well {see point (1) in this chapter}.
 - e. With the above steps and the default camera settings, you will get **license plate reading results**. These events will be listed in the Live interface below the live image.
 - f. After changing any settings (eg.: the field of view, position, direction of the camera, resolution, etc.) **restart** the camera to reset internal statistics.
 4. Fine-tuning

Besides checking everything in the Settings menu, there are a few settings that, in addition to the above, are particularly recommended to check/fine-tune to achieve above-average license plate recognition accuracy.

- a. Set the **Image settings** parameters to as perfect as possible. Take into account the location you are observing and, most importantly, make sure the number plates are legible. Check the good visibility of the license plates for a few days after the camera installation, during the day, night and sunrise/sunset times of the day. Repeat the process later to adjust for the different seasonal changes.
- b. Check the **resolution/FOV of the camera**. The pixel size of the license plate characters' has to be in the mentioned range (**min. 25 pixels**). You may need to **increase the bandwidth** of the video stream if the characters cannot be seen well **{Media / Video}**.
- c. Check the settings of the **ANPR engine {ANPR engine}**. Lowering the minimum confidence parameter will increase the chance of misreading license plates but will also reduce the probability of missing an unrecognized plate.
- d. Set the **country** where the camera is installed so that in the case of a type/country code engine, you increase the priority of the license plate numbers of that country **{ANPR engine}**.
- e. Draw the area on the picture where you expect to see number plates using a mask. This will increase the possibility of speeding up the number plate recognition, and cars parked/passing by in an undesirable place will not trigger an event. **{ANPR engine}**.
- f. During the setup, testing and checking of the operation, it is recommended to display the necessary OSD layer(s) to get technical feedback about the camera's internal operation, changes of image parameters, etc. We suggest displaying the **General/ANPR Status** and **General/Image properties** layers during camera setup **{Overlay}**. Also, display these captions during playback and reduce the playback speed to facilitate more accurate evaluation.

8.2. USING EINAR CAMERA

Below you will find some possibilities for creating access control with Einar and some other options for using the camera. A suitable combination of the following can also be implemented.

8.2.1. Standalone operation with onboard ANPR

The camera itself manages an access point. It activates its output when it recognizes the license plates registered in the camera to give an opening command, e.g., to a barrier. Einar stores events, which can be retrieved, downloaded and exported via the camera's own web interface. In addition to local storage on an SD card, it is also possible to configure an optional http, FTP or GDS server for event upload.

The necessary devices and the most important, specific settings are as follows:

- microSD card
- GPIO cable kit
- Carmen ANPR Engine and License in Einar camera
- ANPR detector with filter enabled. (Registering license plate numbers in "Allowed license plate" field)
- A properly configured HTTP, FTP or GDS server (if required).

8.2.2. Standalone operation with Carmen Cloud

The camera itself manages an access point. It activates its output when it recognizes the number plates registered in the camera to give an opening command, e.g., to a barrier. Einar stores events, which can be retrieved, downloaded and exported via the camera's own web interface. In addition to local storage on an SD card, it is also possible to configure an optional HTTP, FTP or GDS server for event upload. The number plates are detected in the camera, but the number plates are recognized in Carmen Cloud.

The necessary devices and the most important, specific settings are as follows:

- Stable internet connection
- microSD card
- GPIO cable kit
- Einar camera without ANPR Engine and License
- Carmen Cloud subscription
- ANPR detector with filter enabled. (Registering license plate numbers in "Allowed license plate" field)
- A properly configured HTTP, FTP or GDS server (if required).

8.2.3. Integrated operation with 3rd party software

By mounting the camera at an access point, the camera uses its own API to allow the system integrator to connect the camera to the system integrator's own software. If required, the I/O can be used on the camera, or the system integrator can use its own software IO hardware.

The following data is available:

- live video stream,
- still image,
- query the input port status
- output port control
- current event data
- stored events data
- event video, event image, license plate coordinate.

The necessary devices and the most important, specific settings are as follows:

- Stable internet connection (if necessary)
- microSD card
- GPIO cable kit (if necessary)
- Onboard ANPR or Carmen Cloud subscription
- A properly configured HTTP, FTP or GDS server (if required).
- API documentation – it can be found in ATSS support system, or System/Status menu in the camera **{System / Status}**

8.2.4. Integrated operation with ParkIT System

The camera provides video stream and motion information to the ParkIT System software. License plate recognition is processed within the ParkIT System on the server's side. The possible trigger source is transmitted from the camera input to the ParkIT System, then the open command is sent by the ParkIT System to the camera output. The IO management can be done via other (e.g., Moxa) devices as well.

ParkIT System installation manuals can be found in ATSS.

The necessary devices and the most important, specific settings are as follows:

- GPIO cable kit (if necessary)
- Einar camera without ANPR License & Engine
- Einar FW at least v1.8.2
- ParkIT System (Software and License), Carmen (NNC, License, Engine) and server PC

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