

## **AXIS Speed Monitor**

## **User Manual**

# AXIS Speed Monitor

## About the application

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### About the application

AXIS Speed Monitor visualizes the speed of vehicles in a radar detection zone in the camera's live view, and logs the radar tracks on the SD card for statistical processing. The application works on Axis cameras, check the compatibility list on the product page.

For standalone radar installations without a camera, due to privacy concerns or for statistical purpose only, then the application can be installed in the radar directly. The speed overlay will then be visualized in the radar's live view. In this case, the SD card should be installed in the radar to log the statistics.

*The application requires an AXIS Radar D2110-VE for the installation, mounted and configured in accordance with the D2110-VE installation guide and the*

#### Note

To be able to log statistics, install the SD card in the device where the app is installed.

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## Get started

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### Get started

#### Calibrate the radar

Before you set up the connection with the radar and configure the app overlays, you should calibrate the radar for the scene. The radar can be set to run on either **Area monitoring** or **Road Monitoring** depending on the use case.

The radar is ready to use as soon as it is installed. The default live view will show the radar coverage and any detected movement, and you can add detection zones and rules right away.

If the radar is mounted 3.5 m (11 ft) above ground, there is no need to do anything else. If the radar is mounted on a different height you need to calibrate the radar to compensate for the mounting height.

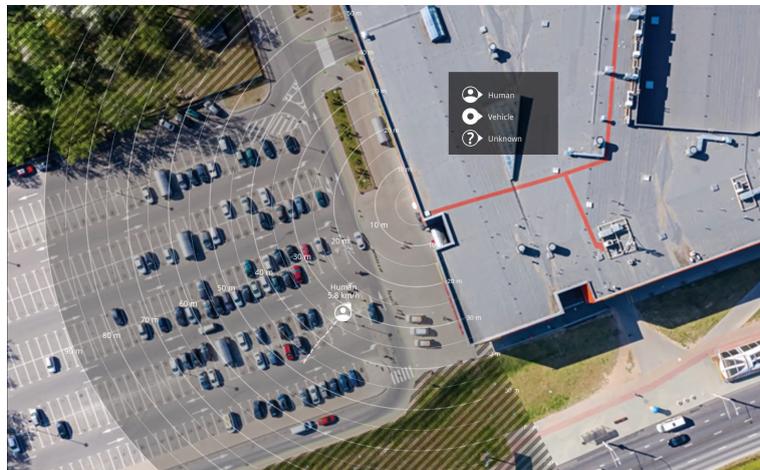
For full radar calibration instructions, see *the web manual for the D2110-VE*.

#### Note

Make sure you enable **Ignore swaying objects** under **Settings > Radar > Detection** and exclude bushes, trees and signs from the include zones. Avoid having a road sign just in front of the radar.  
If you only want statistics of vehicles, go to **Settings > RMD Zones** and select the zone. Click to **Edit zone** and under **Trigger on**, uncheck **Human**.

#### How to calibrate the radar

1. To configure the radar, go to **Settings > Radar > Calibration**.
2. Click **Start** and follow the instructions of the step-by-step guide.



To make it easier to see where objects are moving, you can upload a reference map, for example a ground plan or an aerial photo, that shows the area covered by the radar.

#### Image requirements:

- Supported file formats are jpeg and png.
- The image can be cropped in the radar.
- The image can be rotated  $\pm 35^\circ$  in the radar.
- The orientation is not important, since the radar coverage shape will move to adapt to the image during calibration.

After uploading the reference map you need to calibrate the reference map so that the actual radar coverage fits the position, direction and scale of the reference map.

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Calibration is performed in the web interface by clicking in the reference map. This is the easiest way to calibrate the reference map.

### About detection zones

To determine where to detect motion, you can add multiple zones. Different zones can be used to trigger different actions.

There are two types of zones:

- An **include zone** is an area in which moving objects will trigger rules. The default include zone matches the entire area covered by the detector.
- An **include zone** is an area in which moving objects will trigger rules. The default include zone matches the entire area covered by the radar.
- An **exclude zone** is an area in which moving objects will be ignored. Use exclude zones if there are areas inside an include zone that trigger a lot of unwanted alarms.

### Add an include zone

1. Go to **Settings > RMD zones** and click .
2. Select **Include zone**.
3. Select  to modify the settings of the zone. For more information, see the product's built in help.
4. Modify the shape of the include zone, see [.](#)

### Modify an include zone

Select  to modify an include zone.

- To set the speed range that you want an include zone to trigger on:
  - Under **Trigger between** drag both handles of the slider to set the speed range. Your device will trigger when an object is moving within the speed range.
  - Click **Invert** if you want to set your device to trigger when an object is moving below a certain speed and above a certain speed.
- To see what result the modification has on the include zone:
  - Click **Test alarm**.

### Area monitoring profile

**Area monitoring profile** is best used for objects moving at up to 55 km/h (34 mph). This profile allows you to detect whether an object is human, vehicle, or unknown. A rule can be set to trigger an event when any of these objects is detected. If you want to track only vehicles, you should use the *Road monitoring profile on page 5*.

### Area detection range

Detection range is the distance within which an object can be tracked and can trigger an alarm. It is measured from **near detection limit** (how close to the device a detection can be made) to a **far detection limit** (how far from the device a detection can be made).

The **Area monitoring profile** is optimized for human detection, however, it will also allow you to track vehicles and other objects moving at up to 55 km/h (34 mph) with a velocity accuracy of +/- 2 km/h (1.24 mph).

When mounted at the optimal installation height, the detection ranges are:

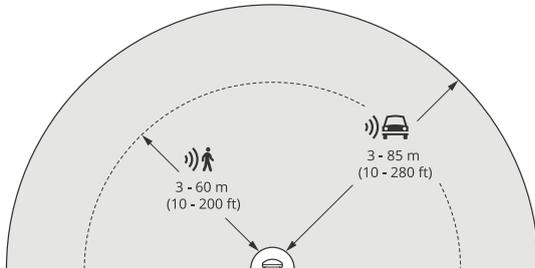
- 3–60 m (10–200 ft) when detecting a human

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- 3–85 m (10–280 ft) when detecting a vehicle



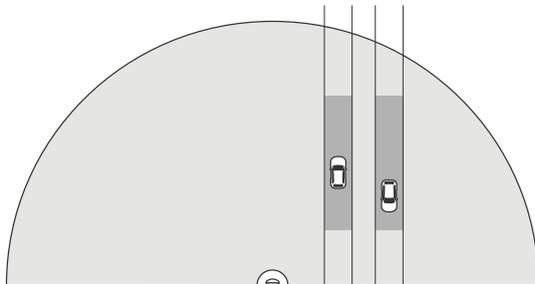
### Road monitoring profile

The Road monitoring profile is best used to track vehicles moving at up to 105 km/h (65 mph) in urban zones, closed zones, and on sub-urban roads. This mode should not be used for detection of humans or other types of objects. To track objects other than vehicles, use your radar in the *Area monitoring profile on page 4*.

### Road installation examples

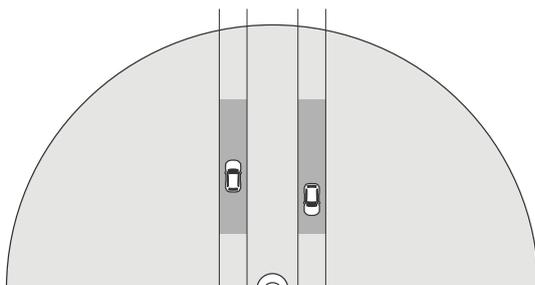
#### Side mounted

To monitor vehicles travelling along a road you can mount the radar on to the side of the road. The radar will provide a lateral coverage distance of 10 m (32 ft).



#### Center mounted

This mounting option requires a stable position. The radar can be mounted on a pole in the middle of the road or on a bridge above the road. The radar will then provide a lateral coverage distance of 10 m (32 ft) to both sides of the radar. The radar covers a broader lateral distance when center mounted.



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### Note

We recommend that the radar is mounted at a height between 3 m (10 ft) and 8 m (26 ft) for the Road monitoring profile.

### Road detection range

Detection range is the distance within which an object can be tracked and can trigger an alarm. It is measured from **near detection limit** (how close to the device a detection can be made) to a **far detection limit** (how far from the device a detection can be made).

This profile is optimized for detection of vehicles and will produce a velocity accuracy of +/- 2 km/h (1.24 mph) when monitoring vehicles moving at up to 105 km/h (65 mph).

Detection range when the radar is mounted at an optimal installation height:

- 25–70 m (82–229 ft) for vehicles moving at 60 km/h (37 mph).
- 30–60 m (98–196 ft) for vehicles moving at 105 km/h (65 mph).

### Note

If the maximum number of radars in the same coexistence zone exceeds two then expect a range degradation of approximately 10% (near) and 20% (far).

### Road monitoring use cases

#### Regulating vehicles in low speed zones

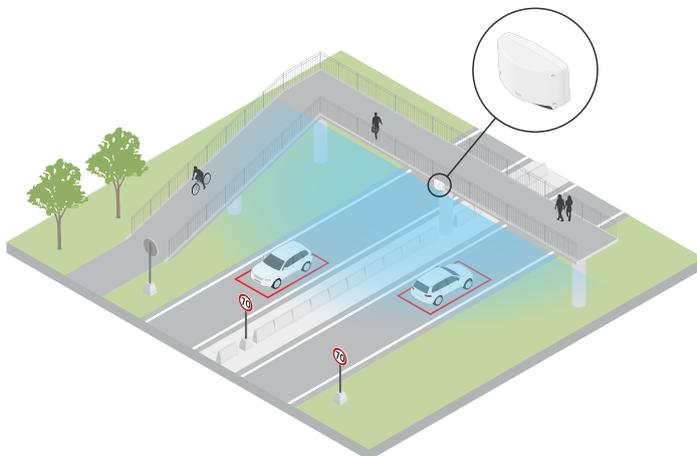
An industrial complex with a long road between two warehouses has installed a radar to help enforce a speed limit of 60 km/h (37 mph). In the **Road monitoring profile**, the radar can detect when a vehicle in its detection zone exceeds that speed. It then triggers an event which sends an email notifications to drivers and managers. The reminder helps increase compliance with the speed restrictions.

#### Unwanted vehicles on a closed road

A small road out to an old quarry has been closed, however, reports of vehicles driving on the road have resulted in authorities installing a security radar in the **Road monitoring profile**. The radar is mounted alongside the road and covers the entire width of the road. Whenever a vehicle enters the include zone, it triggers a flashing beacon that warns drivers to leave the road. It also sends a message to the security team so that they can dispatch a unit if needed.

#### Speed awareness on the road

A road that passes through a small town has had some incidents of speeding. To enforce the speed limit of 70 km/h (43 mph), the traffic control has installed a security radar, in the **Road monitoring profile**, on a bridge that crosses over the road. This has allowed them to detect the speed that vehicles are travelling at and monitor when they should have units stationed along the road to control the traffic.



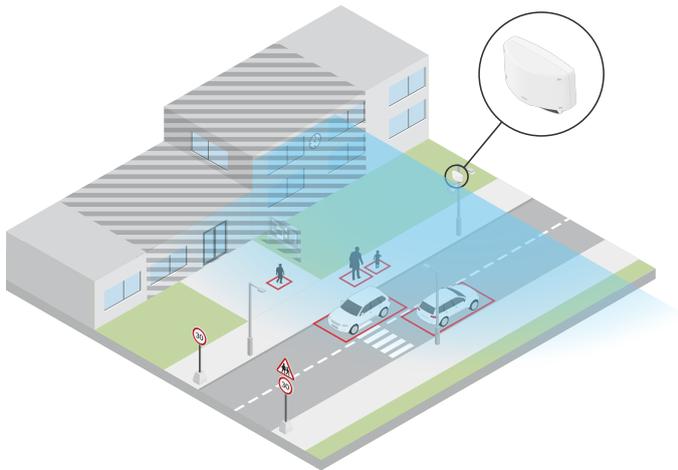
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### Safety with humans and vehicles

Staff at a school have identified two safety issues that they would like to address. They have experienced unwanted visitors entering the premises during the school day, as well as vehicles violating the low speed zone of 20 km/h (12 mph) outside the school. The radar is mounted on a pole, next to the pedestrian walk path. The *Area monitoring profile on page 4* was chosen, as it makes the radar capable of tracking both humans and vehicles moving at speeds lower than 55 km/h (34 mph). This helps the staff keep track of people coming and going during school hours while also being able to trigger a speaker to warn pedestrians when a passing vehicle is driving too fast.



### Download and install the application

To install the application, go to the product page and download the latest version. Access the camera you want to connect to the radar, or you can install the application directly on the radar. Then do the following:

1. Go to **Settings > Apps**.
2. Click **Add app**.
3. Select the file in your downloads folder.
4. Click **Install**.
5. Click **Start** to activate the application.

#### Note

To upgrade the application, just install the new version. There is no need to uninstall the previous version.

### Configure the application

In the cameras webpage under **Settings > Apps**:

1. Go to the **AXIS Speed Monitor** app.
2. Click **Open**.
3. Go to **Connect to radar D2110**.
4. Type the address of the radar, user name and password.
5. Click **Connect**.

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Radar Motion Detection (RMD) zones are imported from the radar and will be listed as labels.

6. Click on the labels to edit the zone parameters. Remove the parameters to remove the zone overlay from view.

### Parameters:

These modifiers can be applied to each of the zones:

- **#n**: Name of the zone
- **#M**: Live speed measurement of the fastest moving object in the zone
- **#c**: How many cars have passed in the last 15min
- **#a**: Average speed in the last 15 min

### Note

To change the name of the zones, go to the radar's web page and then to **Settings > RMD Zones**. Click on the name of the zone to edit.

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## Export statistics

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### Export statistics

You can download the statistics of the day or a set date range. The information in the file includes all detected moving objects within range, and when those objects entered or exited a particular radar motion detection zone. The statistics will be saved as a comma separated file (csv).

Parameters in the file:

- **rmd\_zone name:** Name of the radar motion detection zone.
- **tracking\_id:** The object ID in the radar metadata stream. Restarting the radar will reset the counter to 1.
- **trigger\_count:** The number of times that the RMD zone has been triggered while there is an active tracked object in the RMD zone.
- **object\_class:** Currently, the object classes consists of "Human", "Vehicle" and "Unknown". Select the class you would like to count in the RMD zone.
- **weekday:** The weekday when the **track\_id** entered the include zone.
- **date:** The date the **track\_id** entered the include zone.
- **time:** The time when the **track\_id** entered the include zone. In HH:MM:SS.
- **duration:** How long the **track\_id** spent inside the RMD zone. Given in seconds.
- **enter\_azimuth** and **exit\_azimuth:** The direction the object was pointing when it first entered and exited the radar detection zone. The azimuth is given in degrees, and follows the same convention as radar metadata.
- **enter\_direction** and **exit\_direction:** A textual description of the movement, such as "departing", "rightwards", "approaching" and "leftwards".
- **min\_speed**, **avg\_speed**, **max\_speed:** The minimum, average and maximum speed, respectively, that the object travelled while inside the radar detection zone. Given in kilometers per hour or miles per hour. To change settings in the radar, go to **System > Date and Time > Units**
- **speed\_delta** The difference between the speed the object exited the RMD zone versus when it entered the RMD zone. Given in kilometers per hour or miles per hour. A positive number means acceleration, and a negative means deceleration.
- **alarm:** Denotes whether the object has travelled at an unacceptable speed while inside the RMD zone. 0 means acceptable speed and 1 unacceptable speed at one point.

#### Note

Make sure you have an SD card on the device where you install the app to be able to log the radar tracking data. If the app is installed on the radar, the SD card should be installed on the radar.

# AXIS Speed Monitor

## Set up rules for events

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### Set up rules for events

You can create rules to make your device perform an action when certain events occur. A rule consists of conditions and actions. The conditions can be used to trigger the actions. For example, the device can start a recording or send an email when it detects motion, or show an overlay text while the device is recording.

You can create rules to make your device perform actions when certain events occur. A rule consists of conditions and actions. The conditions can be used to trigger the actions. For example, the device can play an audio clip according to a schedule or when it receives a call, or send an email if the device changes IP address.

To learn more, check out our guide *Get started with rules for events*.

### Trigger an action

1. Go to **System > Events** and add a rule. The rule defines when the device will perform certain actions. You can set up rules as scheduled, recurring, or manually triggered.
2. Enter a **Name**.
3. Select the **Condition** that must be met to trigger the action. If you specify more than one condition for the rule, all of the conditions must be met to trigger the action.
4. Select which **Action** the device should perform when the conditions are met.

#### Note

If you make changes to an active rule, the rule must be turned on again for the changes to take effect.

#### Note

If you change the definition of a stream profile that is used in a rule, then you need to restart all the rules that use that stream profile.

### Activate strobe siren when radar detects a speed violation

Use an Axis strobe siren to let possible speeders know that your perimeter is protected.

This example explains how to activate a profile in the strobe siren whenever AXIS Speed Monitor detects a speed violation using the connected radar.

#### Prerequisites

- Create a new user with the role Operator or Administrator in the strobe siren.
- Create two profiles in the strobe siren: one for when the driver is moving within the allowed speed, and the other when the speed limits are violated.
- Set up AXIS Speed Monitor in the camera, and an include area called "Area 1".

#### Create two recipients in the camera

1. In the camera's device interface, go to **System > Events > Recipients** and add a recipient.
2. Enter the following information:
  - **Name:** Activate virtual port
  - **Type:** HTTP
  - **URL:** http://<IPaddress>/axis-cgi/virtualinput/activate.cgiReplace <IPaddress> with the address of the strobe siren.

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- The username and password of the newly created strobe siren user.
- 3. Click **Test** to make sure all data is valid.
- 4. Click **Save**.
- 5. Add a second recipient with the following information:
  - **Name:** Deactivate virtual port
  - **Type:** HTTP
  - **URL:** http://<IPaddress>/axis-cgi/virtualinput/deactivate.cgi  
Replace <IPaddress> with the address of the strobe siren.
  - The username and password of the newly created strobe siren user.
- 6. Click **Test** to make sure all data is valid.
- 7. Click **Save**.

### Create two rules in the camera

1. Go to **Rules** and add a rule.
2. Enter the following information:
  - **Name:** Activate virtual IO1
  - **Condition:** Applications > Speed Monitor: Area 1
  - **Action:** Notifications > Send notification through HTTP
  - **Recipient:** Activate virtual port
  - **Query string suffix:** schemaversion=1&port=1
3. Click **Save**.
4. Add another rule with the following information:
  - **Name:** Deactivate virtual IO1
  - **Condition:** Applications >Speed Monitor: Area 1
  - **Action:** Notifications > Send notification through HTTP
  - **Recipient:** Deactivate virtual port
  - **Query string suffix:** schemaversion=1&port=1
5. Click **Save**.

### Create a rule in the strobe siren

1. In the strobe siren's device interface, go to **System > Events** and add a rule.
2. Enter the following information:
  - **Name:** Trigger on virtual input 1
  - **Condition:** I/O > Virtual input
  - **Port:** 1
  - **Action:** Light and siren > Run light and siren profile while the rule is active

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## Set up rules for events

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- Profile: select the newly created profile
3. Click Save.

