TrueView Heatmap™ — Manual

embedded for Axis IP cameras

version 2.0

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Overview

TrueView Heatmap™ is a visual tool for measuring traffic patterns inside retail stores. The product also include a trigger system, which can trigger Axis Events when certain movement conditions are met. The product gives instant access to where and when shoppers move within the store, making it a perfect to tool to optimize store layout. Color coding is used to indicate where there has been movement in the video.

TrueView Heatmap™ runs fully embedded in standard network cameras from Axis and should be mounted in the ceiling or on a wall overlooking the store. A camera running TrueView Heatmap™ can at the same time also be used as a standard surveillance camera, potentially reducing the total project hardware cost.

The design of a store is crucial for the shopping experience. Having a well thought through and tested design can help leverage your business dramatically. Measuring how shoppers are using the space of your store gives you the information you need to test and optimize the store layout - potentially leading to improved space utilization and more satisfied and loyal customers. TrueView Heatmap™ provides an easy-to-use tool that allows for a scientific approach to evaluate store design changes. The product can help to pinpoint problem areas, find the best merchandising spots for product campaigns, set shelf rent based on traffic patterns inside store, and more.

- Camera can be used for both surveillance and heatmap analysis at the same time.
- Automated system, operated in real time.
- Fully embedded into network camera.
- Interest regions can be selected, and the movement within these can be stored and compared.
- Interest regions can be selected, and trigger Axis events based on user defined conditions.
- Easy to install and setup.
- View heatmap data directly in camera.
- Store and analyze heat data over long periods of time using TrueView Web Report™.
- Maintain the product remotely over IP, set and monitor parameters, download or stream video.
- Leading digital image processing minimizes shadow and reflection problems.

Mounting the camera

The camera should be mounted overlooking the area of interest and be mounted on a wall or in the ceiling. A small area in the camera view should not able to cover both distant and close objects. This can in most cases be solved by mounting the camera higher.

General guidelines

For best result it is normally good to mask off heatmap color coding everywhere except on the floor. Then only the heatmap color coding along the floor is shown avoiding irrelevant movement shown on shelves, walls, ceilings etc. How masking is done is described below.

In order for the camera and, in effect, TrueView Heatmap™ to function properly, make sure that the lighting is sufficient. A minimum of 80 LUX in the scene is required.

Make sure that no doors or other items are moving within the heatmap area. Do not mount the camera, for example, at an escalator. Also try to avoid getting very strong light and sharp shadows in the camera view.

The TrueView Heatmap™ includes support for defining schedules, turning the service off and on automatically depending on the time of day. Make sure to use this feature, at least for night hours when the light level is too low for operation.

Installing the software

If TrueView Heatmap™ software module is not already installed from your vendor it must be installed manually on the Axis camera.

1. Make sure you have one of the supported Axis IP cameras and that you have the correct corresponding software module of TrueView Heatmap™. The supported cameras and the corresponding software modules are listed in Appendix A.

2. Install the camera on your network, start it up and point your web browser to it. Supported web browsers are Firefox 3.x, Internet Explorer 9, Safari 4 & 5 and Google Chrome.

3. Upload the TrueView Heatmap™ installation file by clicking **Setup** -> **Applications**. Under the section *Select package file to upload* , specify the path to the TrueView Heatmap™ installation file or use the **Browse** button. Click on the **Upload Package** button. When the package upload is finished, the application will start automatically and you will be redirected to the registration page.

   It is always possible to go back to the application management page by entering the camera ip and adding */admin/devtools.shtml* in your browser field. Click the **TrueView Heatmap™** link to get to the Heatmap interface.

Axis application package page

4. At the registration page, you will be asked to enter your license code. Enter your license code and follow the instructions. The software will attempt to activate the license automatically by connecting to a registration server. If the server cannot be

reached you will be asked to activate the license on a computer with Internet access. When the license activation is complete the camera is ready to be used for mapping and detecting movement.

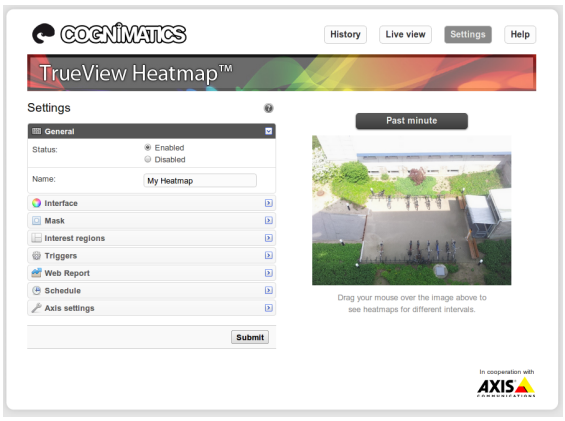
Note that your software license is for one camera only. You can not install the software to another camera without a new registration key.

Registration page.

5. When you update any setting it can sometimes take up to ten minutes for the application to calibrate. You can see if the heatmap produces reasonable results by navigating to the **Live view** page.

Configuring TrueView Heatmap™

The TrueView Heatmap™ settings are divided into categories.

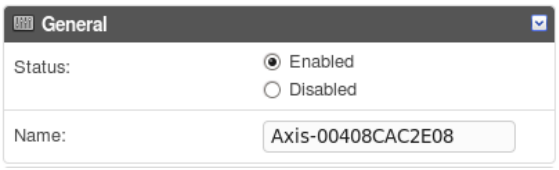


The TrueView Heatmap™ settings page.

Note! Do not forget to press the Submit button when changes in settings are made, otherwise the settings will not be saved.

General

For the basic setup, go to the *General* section. This is where one toggles the mapping status and set the name of the heatmap.

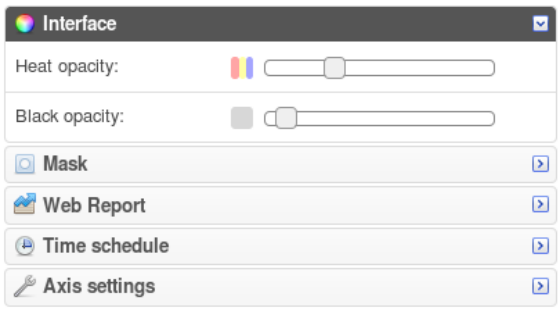


1. Verify that **Status** is set to Enabled.

2. Enter the **name** of the camera or location the TrueView Heatmap™ is viewing. Note that all cameras used for the application need to have unique names.

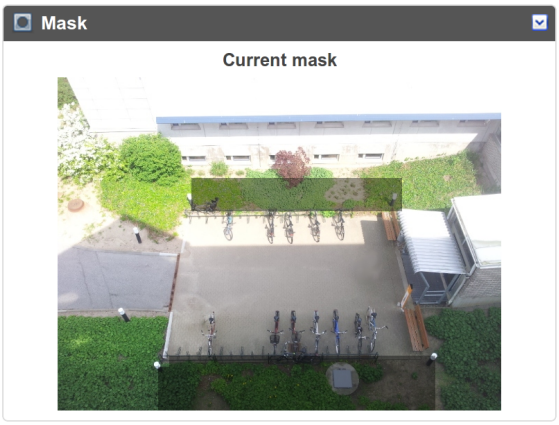
Interface

Some basic opacity settings can be set under the *Interface* section. To change the opacity for the heat in the images drag the *Heat opacity* slider. To change the opacity for the black areas in the heatmap images drag *Black opacity* slider. The changes will not be shown until the Submit is pressed.

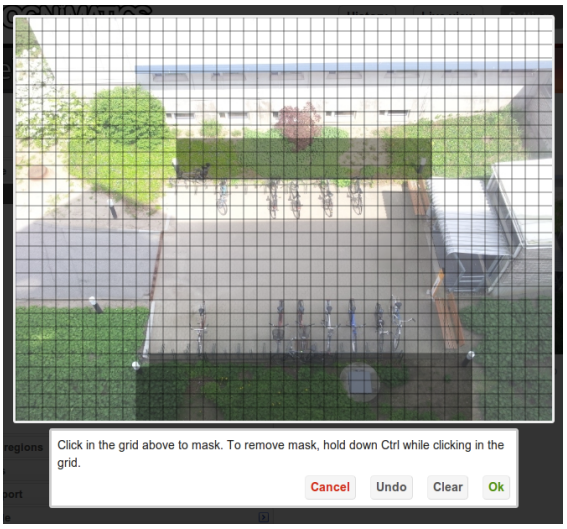


Mask

For best result, mask off the parts of the camera's view where the heatmap color coding should not be displayed. It is normally best to only show heatmap color coding on the floor and to mask off walls, ceiling, shelves etc.



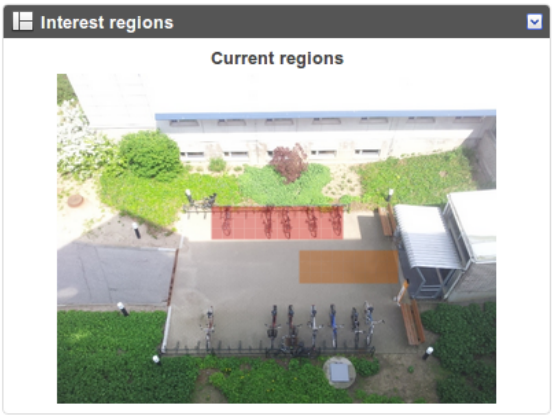
Click in the mask image.



Click and drag with the mouse to mask on and off parts of the camera's view.

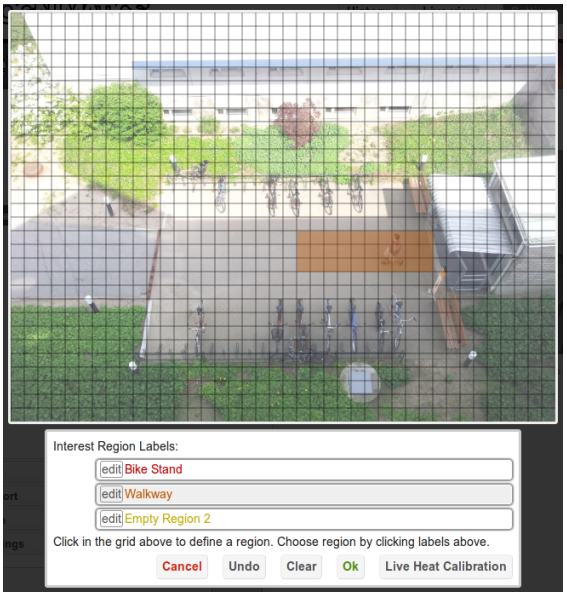
Interest Regions

TrueView Heatmap™ has the possibility to monitor the flow within different regions in the camera view. This is later used to show recent statistics and to set alarm triggers for the different regions respectively.

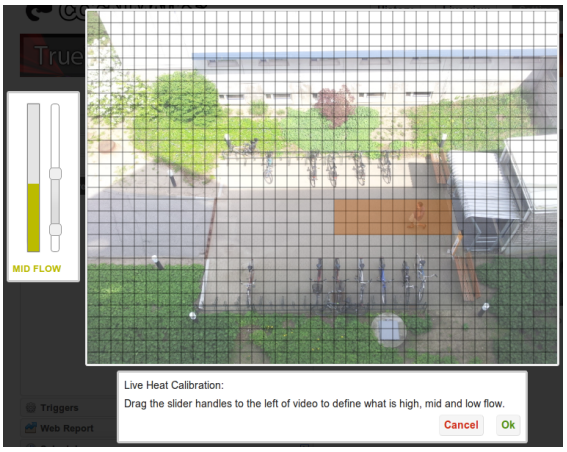


Click in the regions image. This will open the interest region editor seen below.

Click and drag with the mouse to draw 'interesting' regions in the camera's view. You can switch which region is currently drawn by clicking on their names found in the foldout below the camera view. Click edit to set the name of each region.



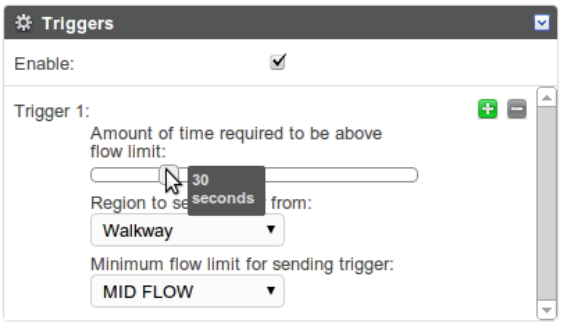
To the bottom right you will find the **Live Heat Calibration** button. Click this to show a live flow measuring bar for your current region. The next step is to set limits for what you consider to be *Low*, *Mid* and *High* flow for the region by using the slider next to the flow bar. You will of course have to do this at a time when there actually is a considerable amount of flow in the region.



Click the **Ok** button when you are done with your regions and also do not forget to click **Submit** to save them.

Triggers

Under the *Triggers* tab you will find the possibility to trigger Axis events when there is a certain amount of flow in your interest regions. This means that you can for example have an Email sent or an audio-clip played in your speakers when you have high flow in a certain region for a certain amount of time.



1. Check the *Enable* check-box to enable triggers from flow in your regions.

2. Drag the slider to set how long it is required to be flow in your region before sending the trigger.

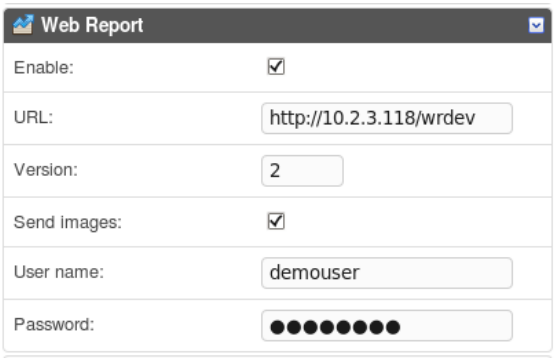
3. Select which region TrueView Heatmap™ should monitor for this trigger.

4. Select which flow limit is the minumum for sending the trigger.

The action for the trigger is defined in Axis Settings -> Events -> Event Types. Click **Add triggered**. Now click **Triggered by** and choose *Application trigger*. The different triggers created earlier will pop-up to choose from. **Note!** One can set a minimum time interval between the triggers in this window. This is helpful for avoiding scenarios where e.g. a trigger keeps sending an email every minute because a trigger condition is continuously fulfilled for a long time period.

Web Report

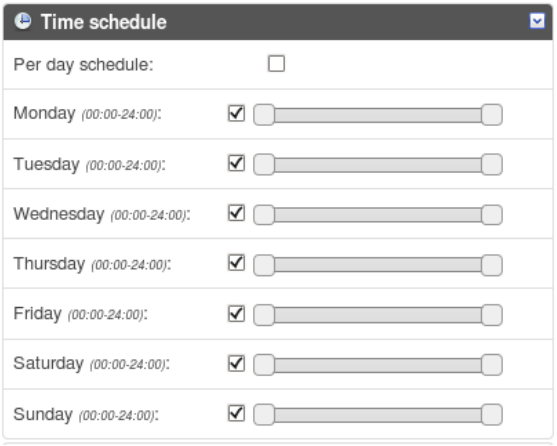
Apart from showing heatmap images in the camera interface and serving plain text data, TrueView Heatmap™ can also push heatmaps to the TrueView Web Report™. The settings for this are found in the *Web Report* section.



1. Check the *Enable* check-box to enable pushing data to TrueView Web Report™.
2. Enter the Web Report server address and your account credentials.

Time schedule

Under the *Time schedule* section start and stop times for the heatmap can be set individually for each day of the week. By unchecking the Per day schedule box, changing the times for one day will affect all days. Unchecking a box by the sliders will disable mapping for that particular day.



Axis settings

You can set the standard parameters of the AXIS camera by selecting one of **Users**, **TCP/IP** or **Date & Time** in the *Axis settings* section. See your AXIS camera manual for how to set the parameters. To assure the best mapping performance, avoid using any camera built-in functionality that may affect the performance. Do not set any other parameters than:

Live view

To access this page, browse the camera running the TrueView Heatmap™ and click *Live view* in the upper right corner. If you have defined atleast one interest region, the live view page consists of three parts:

1. The video stream with a color coded overlay.

2. The interest region measurements, updated in real-time.

3. The interest region charts, showing statistics from the different regions.

Live Heat

In the upper left part of the live view you can see the video stream with a heat overlay. The heat overlay shows the latest minute of heat recorded. This interval can be changed using the slider to the left of the video stream.

There are three icons to the left of the video stream. The first one switches between video and still picture. The still picture is an estimation of what the scene looks like without moving objects. This image may look inaccurate the first minutes after startup.

The second icon will activate the fullscreen mode. Other features in the live view will be hidden while in fullscreen mode.

The third icon will stretch the heat overlay. The stretching is done by increasing the overall heat until the 'hottest' part of the overlay has reached maximum heat.

Real-Time Measurements

If you have defined interest regions, measurements from these regions will be shown in the lower left corner.

Interest Region Statistics

In the upper right corner there is a chart, showing statistics from the interest regions. You can switch between different time intervals using the slider to the right of the chart.

You can hover the mouse cursor over the line bullets to see the exact time interval of a data point.

The chart will show data scaled using the heat calibration done in the settings, where you can divide the heat into low, mid and high flow. This will make it easier to compare different areas which might differ in size, distance or behaviour.

History

TrueView Heatmap™ can store heat data up to five days in five minute intervals. On the *History* page all available heat data can be shown by dragging the slider. You can select a specific day and use the slider to see different times during that day, or choose to view all available days and slide through the entire time interval.

There are two icons to the left of the video stream. The first one allows you to switch between the still picture and the video stream. The still picture is an estimation of what the scene looks like without moving objects. This image may look inaccurate the first minutes after startup.

The second icon will stretch the heat overlay. The stretching is done by increasing the overall heat until the 'hottest' part of the overlay has reached maximum heat.

Note

The slider is disabled if no data is available

HTTP API

1. **Request heatmap image**: Returns a heatmap as an image
2. **List available data**: Returns a list of days where data exists
3. **Download binary data**: Returns Cognimatics proprietary format

4. **Request text data**: Returns an heatmap in readable numbers
5. **Request CSV data**: Returns historical region data in CSV format.
6. **Clear local heatmap data**
7. **Show the system log**
8. **Generate a log archive**: Generates a gzip'ed tarball containing log files and settings

1. Request heatmap image

URL

```
http://<servername>/local/heatmap/.api?
heatmap.png[&time=<timestamp>|
from=<timestamp>&to=<timestamp>|interval=<interval>]
[&stretch=1]
```

where `<timestamp>` is a 14 character timestamp in YYYYMMDDhhmmss format; `<interval>` is a time interval either 1m, 5m or 30m for the past 1 minute, 5 minutes or 30 minutes, respectively; and `stretch=1` is given to scale the heat values to the minimum/maximum range. If no arguments are given, the 1-minute interval is returned, without stretch scaling.

Format
PNG

Method
GET

Return
A heatmap image

2. List all days, for which there is heatmap data

URL

```
http://<servername>/local/heatmap/.api?list-hmp.json
```

Format
JSON

Method
GET

Return

```
{
  "timestamp" : "<timestamp>",
  "days" : {
    "YYYYMMDD" : ["hhmmss", [..] "hhmmss"],
```

```
    [..]
    "YYYYMMDD" : ["hhmmss", [..] "hhmmss"]
  }
}
```

`<timestamp>`
time in the camera in the format `YYYYMMDDhhmmss`

`<days>`
an object of days where there exists data where the day is the key the value is an array of times where data exists for respective day.

Example
List all days of data available in TrueView Heatmap™

URL
`http://<servername>/local/heatmap/.api?list-hmp.json`

Return

```
{
"timestamp" : "20110116071553",
  "days" : {
    "20110115" : ["235000", "235500"],
    "20110116" : ["000000", "000500"]
  }
}
```

3. Download .hmp data file

URL
`http://<servername>/local/heatmap/.api?export-hmp&time=<timestamp>`

where `<time>` can be a timestamp of the form `YYYYMMDDhhiiss`

Format
hmp

Method
GET

Return
This script returns a Cognimatics proprietary binary data file for the given timestamp

Example
Request historical data for the 12th of May 2011 16:10 - 16:15.

URL
`http://<servername>/local/heatmap/.api?export-hmp&date=20110512161500`

4. Download readable text data file

URL

`http://<servername>/local/heatmap/.api?export-text&time=<timestamp>`

where `<time>` can be a timestamp of the form `YYYYMMDDhhiiss`

Format

>text/plain

Method

GET

Return

This script returns a Heatmap with 80 x 60 numbers between 0 and 255 representing a Heatmap. Each row in the output is a new row in the heatmap image.

5. Request CSV data

URL

`http://<servername>/local/heatmap/.api?export-csv[&date=<date>][&res=<res>]`

where `<date>` can be

- a date of the form `YYYYMMDD`
- a date interval of the form `YYYYMMDD-YYYYMMDD`
- comma separated dates of the form `YYYYMMDD,[..],YYYYMMDD`
- `all` (default) for all available data

and `<res>` can be

- `5m` (default) for data in 15 minute bins
- `1h` for data in 1 hour bins
- `24h` for data in 1 day bins

Format

CSV

Method

GET

Return

This script returns data in plain text, comma-separated values. The region values has the span *[0,100]*. The first line contains a description of each element, and

the following lines contain the corresponding data for the chosen time interval and resolution.

Example
Request historical CSV data for the 12th and the 15th of May 2012 with 5 minute resolution.

URL
```
http://<servername>/local/heatmap/.api?export-csv&date=20120512,20120515&res=5m
```

6. Clear local heatmap data

URL
```
http://<servername>/local/heatmap/.api?clear-data
```

Format
text/plain

Method
GET

Return
`OK`

7. Show the system log

URL
```
http://<servername>/local/heatmap/.api?show-logs
```

Format
Plain text

Method
GET

Return
Displays the system logs.

8. Generate a log archive

URL
```
http://<servername>/local/heatmap/.api?generate-logs
```

Format
tar.gz

Method
GET

Return
A log archive.

Troubleshooting

The video does not show on the History page.

Make sure no one else is watching the video and click reload in your web browser.

The setting page does not show the parameter values.

Reset to factory default after installation and restart the camera.

The software does not upload to TrueView Web Report™.

Go to `http://<servername>/local/heatmap/.api?show-logs` in your web browser and see if the logs can help you. Note that some times it can take up to half an hour for the software to upload data to TrueView Web Report™.

A. Supported cameras

Table A.1. Supported cameras

Camera model	Software module
Axis cameras with support for Axis Camera Application Platform	TrueView_Heatmap_2_0_ARTPEC-3__x.y-z.eap

x, y and z indicate the version number of the software module.