
TrueView Bicycle™ — Manual

embedded for Axis IP cameras

version 2.0

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Overview

TrueView Bicycle™ is a fully embedded software module for Axis IP cameras. TrueView Bicycle™ offers an unbeaten solution for bicycle and pedestrian counting with features such as

1. **Embedded counting** – Fully embedded into Axis IP cameras. TrueView Bicycle™ is a powerful stand-alone counter, running directly in your Axis camera, requiring no dedicated computer. All counting is done in the camera, effectively turning it into a sensor for counting.
2. **IP technology** – Using IP technology it offers a cost efficient, infinitely scalable, easy-to-install and flexible system for automatic traffic counting.
3. **Maintenance** – Maintain your counter remotely over IP, set and check parameters, and stream video.
4. **Web reporting** – Automatically export counting data to TrueView Web Report™.
5. **Bi-directional counting** – The module simultaneously differentiates and counts pedestrians and bicycles moving upwards and downwards in the camera view.
6. **Statistics** – Built-in graphs in the camera web interface.

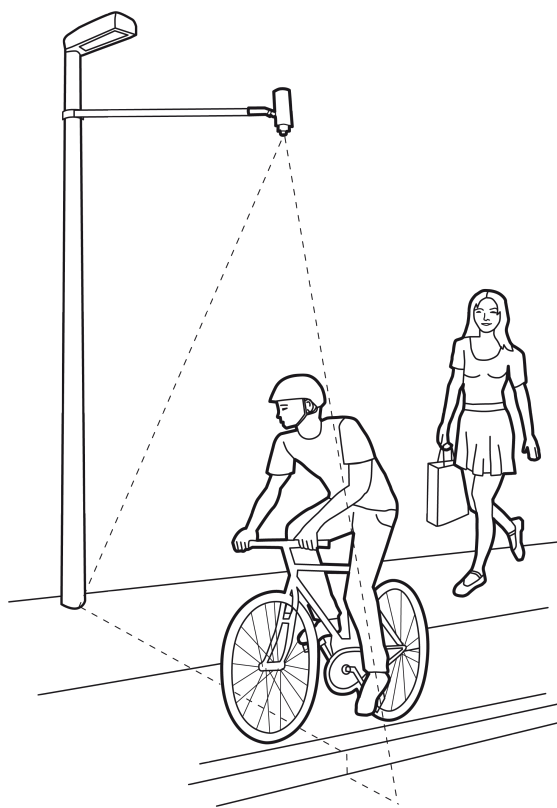
There are several ways to use the data from TrueView Bicycle™:

- View real-time counting data
- View graphs of historical data directly on the camera
- Download data through an open API.
- Use TrueView Web Report™, a powerful statistical software package, for managing and monitoring historical data.

Historical data is available on the camera for up to 90 days and is updated every 15 minutes. The data is stored in 15-minute bins representing the in and out counts for the 15-minute periods.

Mounting the camera

The camera should be mounted straight above the point where people should be counted and should be facing straight down.



Mount the camera facing straight down

Height and width

TrueView Bicycle™ allows a mounting height range from 250 cm and up depending on camera model. The recommended minimum height, however, is 300 cm. As a rule-of-thumb, one counter unit will cover a passage as wide as the camera mounting height. Depending on the camera model and lens focal length, both the height range and the covered width can be increased.

Positioning the camera

Adjust the position of the camera so that it is natural for people to pass through the camera's view vertically. If you install TrueView Bicycle™ prior to mounting the camera, you can use the lines indicating the counting zone to guide you. The red area should run from left to right, across the path people will take when passing underneath the camera.

General guidelines

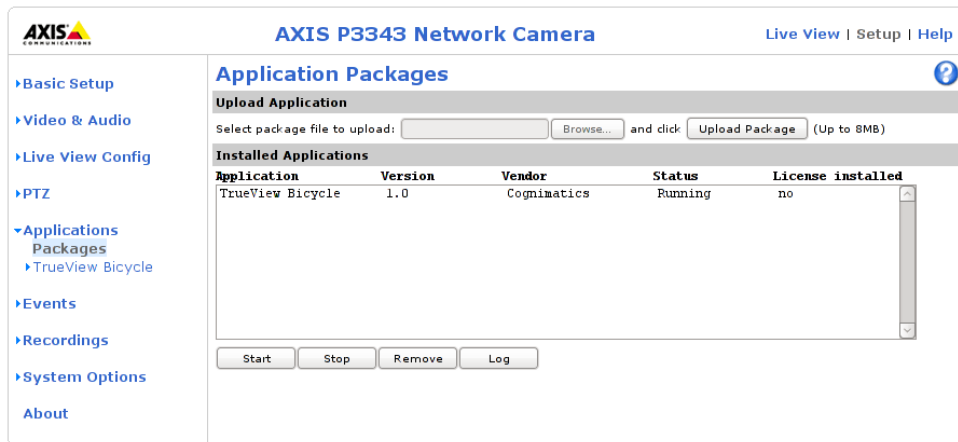
In order for the camera and, in effect, TrueView Bicycle™ to function properly, make sure that the lighting is sufficient. A minimum of 80 lux in the scene is required.

Make sure that no items are moving within the counting area, apart from pedestrians and bicycles. If possible, try to avoid getting very strong light and sharp shadows in the camera view.

Installing the software

If TrueView Bicycle™ software module is not already installed from your vendor it must be installed manually in your Axis camera.

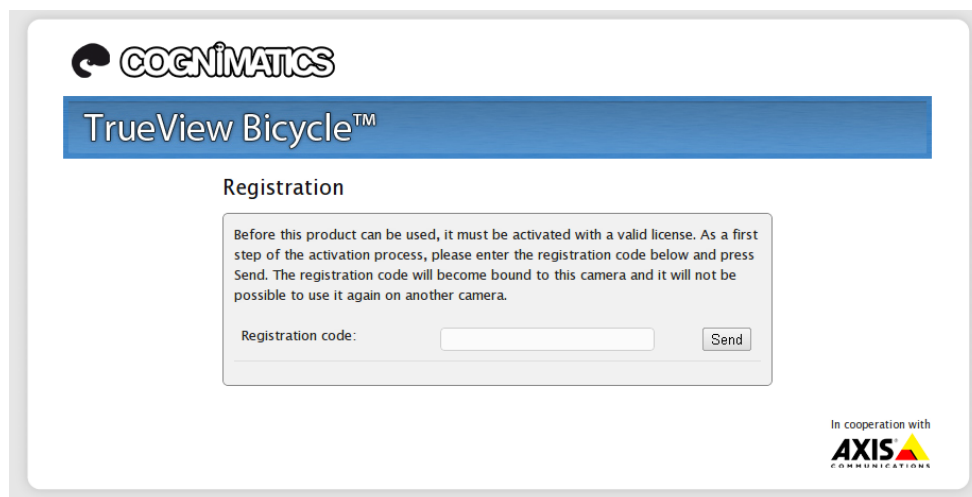
1. Make sure you have one of the supported Axis IP cameras and that you have the correct corresponding software module of TrueView Bicycle™. The supported cameras and the corresponding software modules are listed in Appendix A.
2. Install the camera on your network, start it up and point your web browser to it. Supported web browsers are Firefox 3.x, Internet Explorer 7 & 8, Safari 4 & 5 and Google Chrome 4 & 5.
3. Upload the TrueView Bicycle™ installation file by clicking **Setup** -> **Applications**. Under the section *Select package file to upload*, specify the path to the TrueView Bicycle™ installation file or use the **Browse** button. Click the **Upload Package** button. After successful installation, the software should start automatically. To start the counter explicitly, click **Start**.



Axis P3343-VE application package page

4. Click the **TrueView Bicycle™** link to get to the counter interface. The first time you do this, you will be asked to enter your registration code. Enter your registration 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 counting.

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 counter to initiate fully. You can see if the counter is counting by navigating to the **Live view** page and view people passing the counting zone.

Configuring TrueView Bicycle™

Note: To ensure accurate counting, TrueView Bicycle™ must be calibrated before use. This is done using either the Visual height setting or the manual calibration procedure.

The counter settings are divided into three categories: *Basic/counting*, *reporting* and *connectivity*. There are also direct links to some basic Axis camera settings for your convenience.

Basic counting configuration

For the basic setup, go to the *General* section. This is where one toggles the counter status, names the counter and sets the most fundamental parameters.

1. Verify that Counter **status** is set to Enabled.
2. Enter the **name** of the camera or location the TrueView Bicycle™ is viewing. Note that all cameras used for counting need to have unique names.

3. Set an initial calibration for the counter. Depending on which camera model you are using, this is done in two different ways:

- If there is a Cognimatics calibration available for your unit, input the mounting height in the Visual height field, along with the appropriate unit.
- If there is no calibration available, set the Calibration mode to Manual setting and click setup. Set the size of the yellow box such that it just covers an object to count.

Depending on e.g. lighting conditions, the counter may need to be fine-tuned for optimal performance. The settings above are used for fine-tuning. See the section called “Tuning and validation” for more info.

4. If the camera can use different lenses, verify that the **lens** setting corresponds to the lens currently mounted on the camera.
5. Set the **direction** through the camera view, in which objects are to be counted as going in when passing underneath the camera.

Under the **Counting zone** section one can adjust the area, in which counting will take place. The counting zone is indicated in the image by two blue lines and a red area. The red area is the virtual counting line and the blue lines show the extent of the counting zone. For proper counting, objects need to be visible within the entire zone. You will notice that there are certain limitations on these values as well as the visual height setting.



1. The *Line offset* moves the entire counting zone upwards or downwards. How much it can be moved will depend on the counting zone size.
2. Use the *Counting zone width* setting to shorten/move the counting lines sideways.

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

Under the *Counting schedule* section, start and stop times for the counter 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 each slider will disable counting for that particular day.

Counting schedule	
Per day schedule:	☒
Monday (03:30-24:00):	☒ [Slider]
Tuesday (00:00-24:00):	☐ [Slider]
Wednesday (01:50-20:05):	☒ [Slider]
Thursday (05:40-17:05):	☒ [Slider]
Friday (00:00-24:00):	☐ [Slider]
Saturday (03:50-24:00):	☒ [Slider]
Sunday (00:00-24:00):	☒ [Slider]

Reporting configuration

Apart from showing statistics in the camera interface and serving CSV/XML/JSON data, the counter software can also push count data to the TrueView Web Report™. The settings for this are found in the *Web Report* section. TrueView Web Report™ must be version 2.3 or higher to be compatible with TrueView Bicycle™.

Web Report	
Enable:	☐
URL:	
Version	2 [v]
User name:	
Password:	

1. Check the *Enable* check-box to enable pushing data to TrueView Web Report™.
2. Select the correct version of TrueView Web Report™ that will be accessed.
3. Enter the Web Report server address and your account credentials.
4. If the camera resides behind a proxy server, enter the proxy server address and credentials.

In the *Events* section you can enable if the counter should generate events for each passage. Please read more about this functionality in the Events section in the manual.

Connectivity configuration

If there are several counters on your network you can enter them in the *Additional counters* section. Enter the address to the counters in the URL field and click the key icon to add credentials. This makes it possible to see statistics from all counters on the statistics page of one counter. Up to 30 additional counters can be added.

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 counting performance, avoid using any camera built-in functionality that may affect the counting accuracy. Do not set any other parameters than:



- a. Local time
- b. IP address
- c. Users

Live view

To see when TrueView Bicycle™ is counting you go to the *Live view* page. This page can also be a great help when polishing the settings. To the right the latest counts are shown in a table.

The screenshot shows a web browser window with the URL `10.2.3.163/bicycle/liveview.html`. The page features the COGNIMATICS logo and navigation buttons for Statistics, Live view, Settings, and Help. The main heading is "TrueView Bicycle™".

Under the "Live view" section, there is a camera feed showing a sidewalk with a red detection zone. Below the feed, the current counts are displayed:

	In ↑	Out ↓
Pedestrians	28	31
Bicycles	2	2

To the right of the camera feed is a table showing the history of counts over time:

	Pedestrians		Bicycles	
	In	Out	In	Out
26 seconds ago	0	1	0	0
36 seconds ago	1	0	0	0
45 seconds ago	0	1	0	0
1 minute ago	1	0	0	0
2 minutes ago	0	1	0	0
3 minutes ago	0	1	0	0
4 minutes ago	1	0	0	0

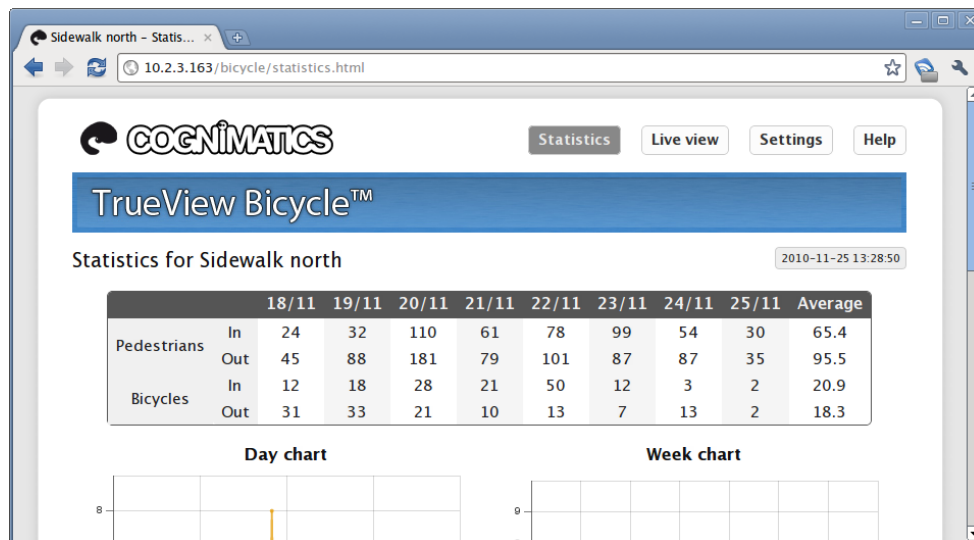
In the bottom right corner, it says "In cooperation with" followed by the AXIS COMMUNICATIONS logo.

Statistics

You can configure your TrueView Bicycle™ in different ways to generate the statistics you require. You can obtain statistics from your counters in four different ways.

1. **Real time data with graphs** – This data is updated in real time every time a request is made. Click on Statistics at the top left hand side of the page to see data updated in real time.

The table on the statistics page will contain in and out counts for the past week along with the average count. Beneath the table there are two charts. The left chart (*Day chart*) shows counts of the current day while the right chart (*Week chart*) shows values for the past week (not including the current day). When new data is available the day chart will automatically be updated.



Data files can be downloaded in cnt, xml, csv or json-format by selecting the format and click day you want the data for. For csv, xml and json different time resolutions can be chosen as well. If you want to download all files for a certain format just press the All link.

If additional counters are specified in the settings you will see a link in the upper right corner with the text "Additional counters". By clicking this link you can see data from all counters that your counter can connect to.

2. **TrueView Web Report™** – Installing TrueView Web Report™ on a web server lets you manage and view historical data conveniently. For more information about these statistical software packages we refer to their respective manuals.

At the bottom of the statistics page you can find data from TrueView Bicycle™ in both binary and text formats.

3. **HTTP API** – Download data in text format using the HTTP API described below.
4. **Events** – Let the counter generate events for each passage, with 1 second resolution.

Tuning and validation

When the cameras are installed and counting it is recommended to validate the accuracy and fine-tune the system. This is likely to increase the accuracy or identify counting units with problems.

Begin with an overview of the traffic numbers. Look at the numbers for all cameras a couple of days back. If the difference between number of persons going in and out is <5-10% then this is a good first indication that the TrueView Bicycle™ system is configured correctly.

To validate each camera:

1. Go to the **Live View** page of the camera.
2. Make a note of the numbers for the dominant traffic direction.
3. Manually count 100 or more passages.
4. Compare the number between your manual count and the TrueView Bicycle™ system count. The difference between the system count and the manual count should be less than 10 %.
5. If the difference is sufficiently small you can move on to the the next camera.
6. If the difference is >10 % then TrueView Bicycle™ needs to be manually tuned.
7. Make sure the camera is mounted according to the guidelines in this document.
8. Depending on the camera model used, or rather if the counter is running in calibrated or manual mode, either adjust the visual height setting or adjust the size of the yellow box defining the shape of a person. These changes will adjust the internal parameters of the counter.
 - a. If TrueView Bicycle™ is counting too much compared to the ground truth, then decrease the visual height with around 10 cm *or* increase the size of the box slightly.
 - b. If TrueView Bicycle™ is counting too few compared to the ground truth, then increase the visual height with around 10 cm *or* decrease the size of the box slightly.
9. Go back to step 3 to validate the accuracy. Please note that TrueView Bicycle™ will need a couple of minutes after saving parameters before counting accurately.



Use the live view to guide you.

Counter status via SNMP

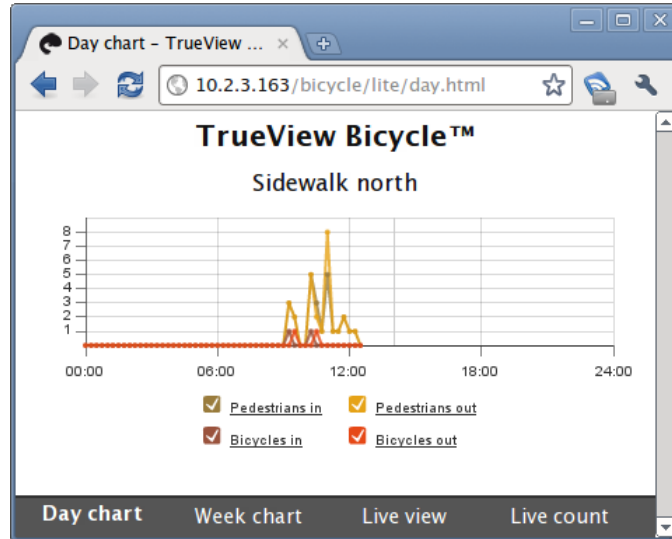
TrueView Bicycle™ can be configured to provide status reports and data using the SNMP protocol. Please see the Technical Materials section, <http://www.cognimatics.com/support/technical/materials/snmp>, on the Cognimatics website for more information on how to use this feature.

Lite web interface

There is a light-weight version of the web interface at the URL `http://<servername>/bicycle/lite/index.html`. These pages can for instance be used to embed TrueView Bicycle™ into other systems like Axis Camera Station and Milestone's XProtect Smart Client.

There are four pages available:

1. `http://<servername>/bicycle/lite/day.html`: The page shows the day plot, the same plot that can be seen on the Statistics page.
2. `http://<servername>/bicycle/lite/week.html`: The page shows the week plot, the same plot that can be seen on the Statistics page.
3. `http://<servername>/bicycle/lite/count.html`: A page that shows the live count for the current day.
4. `http://<servername>/bicycle/lite/liveview.html`: A slim version of the Live view page that shows live count and the video stream with the counting area as overlay.



The Day chart page in the lite interface.

The menu at the bottom of the pages can be disabled by appending ?clean to the URL:s above, e.g <http://<servername>/bicycle/lite/liveview.html?clean>.

HTTP API

1. **Request real-time data:** Returns JSON file with real time counting data
2. **List available data:** Returns a list of days where data exists
3. **Download binary data:** Returns Cognimatics proprietary format
4. **Request CSV data:** Returns a file with comma-separated values
5. **Request JSON data:** Returns a JSON file containing historical data
6. **Request XML data:** Returns an XML file containing historical data
7. **Clear local counting data**
8. **Live view information:** Returns information about the placement of the lines in Live view
9. **Show the system log**
10. **Generate a log archive:** Generates a gzip'ed tarball containing log files, settings and data

1. Real-time data

URL

<http://<servername>/local/bicycle/.api?live-sum.json>

Format

JSON

Method

GET

Return

```
{
  "serial": "<camera-serial-number>",
  "name": "<counter-name>",
  "timestamp": "<timestamp>",
  "pin": <pedestrians-in>,
  "pout": <pedestrians-out>
  "bin": <bicycles-in>,
  "bout": <bicycles-out>
}
```

<camera-serial-number>
the serial number of the camera

<counter-name>
name of the counter

<timestamp>
time in the camera in the format YYYYMMDDhhmmss

<pedestrians-in>
number of pedestrians that have passed in until now during the current day

<pedestrians-out>
number of pedestrians that have passed out until now during the current day

<bicycles-in>
number of bicycles that have passed in until now during the current day

<bicycles-out>
number of bicycles that have passed out until now during the current day

Example

Request real time data from TrueView Bicycle™.

URL

http://<servername>/local/bicycle/.api?live-sum.json

Return

```
{
  "name": "Exit south",
  "timestamp": 20100517132154,
  "in": 2,
```

```
"out":18
}
```

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

URL

http://<servername>/local/bicycle/.api?list-cnt.json

Format

JSON

Method

GET

Return

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

<timestamp>

time in the camera in the format YYYYMMDDhhmmss

<days>

an array of days where there exists

Example

List all days of data available in TrueView Bicycle™

URL

http://<servername>/local/bicycle/.api?list-cnt.json

Return

```
{
  "timestamp" : "20100513132513",
  "days":["20100510", "20100511", "20100513"]}
}
```

3. Download .cnt data files

URL

http://<servername>/local/bicycle/.api?export-cnt&date=<date>

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 for all available data

Format
cnt

Method
GET

Return
This script returns a Cognimatics proprietary binary data file for the given date(s).

Example
Request historical data for the 12th to the 15th of May 2010.

URL
http://<servername>/local/bicycle/.api?export-cnt&date=20100512-20100515

Example
Request all available historical data.

URL
http://<servername>/local/bicycle/.api?export-cnt&date=all

4. Request CSV data

URL
http://<servername>/local/bicycle/.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

- 15m (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 format

Example

Request historical CSV data for the 12th and the 15th of May 2010 with 15 minute resolution.

URL

```
http://<servername>/local/bicycle/.api?export-  
csv&date=20100512,20100515&res=15m
```

Example

Request historical data for all available days, with 24 hour resolution.

URL

```
http://<servername>/local/bicycle/.api?export-  
csv&date=all&res=24h
```

5. Request JSON data

URL

```
http://<servername>/local/bicycle/.api?export-  
json[&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

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

Format

JSON

Method

GET

Return

This script returns data in JSON format.

Example

Request historical JSON data for the 24th November 2010 with 15 minute resolution.

URL

`http://<servername>/local/bicycle/.api?export-
json&date=20101124&res=15m`

6. Request XML data

URL

`http://<servername>/local/bicycle/.api?export-
xml[&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

- 15m (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 XML format. The DTD file can be found at `http://<servername>/bicycle/appdata.dtd`

Example

Request historical XML data for the 12th and the 15th of May 2010 with 15 minute resolution.

URL

http://<servername>/local/bicycle/.api?export-xml&date=20100512,20100515&res=15m

7. Clear local counting data

URL

http://<servername>/local/bicycle/.api?clear-data

Format

text/plain

Method

GET

Return

OK

8. Live view information

URL

http://<servername>/local/bicycle/.api?cntpos.json

Format

JSON

Method

GET

Return

Information about the counting area.

```
{
  "width":<width>,
  "height":<height>,
  "left":<left>,
  "right":<right>,
  "top":<top>,
  "bottom":<bottom>,
  "yfirst":<yfirst>,
  "ylast":<ylast>,
  "radius":<radius>
}
```

<width>, <height>
dimension of the video stream

<left>, <right>
x coordinates in pixels for start and stop for the blue lines in Live view

<top>, <bottom>

y coordinates in pixels for the two blue lines in Live view

<yfirst>, <ylast>

y coordinates in pixels for the top and bottom of the red counting area, disregarding curvature

<radius>

radius in pixels describing the curvature of the red counting area, as measured in the center of the area on both axes, or 0 if the area is not curved

Example

Request Live view information from TrueView Bicycle™.

URL

http://<servername>/local/bicycle/.api?cntpos.json

Response

```
{
  "width":320,
  "height":240,
  "left":0,
  "right":296,
  "top":88,
  "bottom":224,
  "middle":136,
  "yfirst":88,
  "ylast":152,
  "radius":0
}
```

9. Show the system log

URL

http://<servername>/local/bicycle/.api?show-logs

Format

Plain text

Method

GET

Return

Displays the system logs.

10. Generate a log archive

URL

http://<servername>/local/bicycle/.api?generate-logs

Format

tar.gz

Method

GET

Return

A log archive.

Events

The counter can generate events for each passage, with 1 second time resolution. The daemon that handles the event system can act either as a server or as a client. When running as a server a client may connect to the counter to start receiving events. When running as a client, the daemon itself connects to a provided listener that collects the events and handles the information.

Example code is available for those who want to write their own event handler.

Maintenance

On the *Maintenance* page (found under **Help > Maintenance**) there are several options for simplifying maintenance of TrueView Bicycle™.

1. **Restart** If you find the counting inaccurate or the web interface unusually slow, you may try restarting the running services or restart the camera.
2. **Logs** If you have any trouble with your camera you can send counter logs to Cognimatics. These can be generated by pressing the **Generate logs** button. After a while you will be prompted with a file you can save to your computer and send to support@cognimatics.com.
3. **Record video** You can use this feature to record video from your camera, locally to your computer. Just select the desired duration of the video and press **Record**.
4. **Patch software** When minor modifications to the counter software is made they are usually released as patches that will be provided by Cognimatics. When you have such patch file you can use it by selecting the file in the form and press **Upload and patch**.

Troubleshooting

The video does not show in Live view.

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

The software asks for registration code every time.

Reset to factory default after installation and restart the camera.

The software prompts me with a warning saying that the frame rate is too low.

- If the scene is too dark, the Axis camera does not deliver enough frames per second for TrueView Bicycle™ to work. The scene must have an illumination of at least 80 LUX.
- When streaming video from the camera make sure to open only one stream at a time and to stream in 320x240 MJPEG format.

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/bicycle/.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™.

The software does not count.

Make sure you reset to factory default after installation and restart the camera. Make sure the scene is well lit. People Counter only works when the scene has at least 80 LUX.

The software does not count after changing parameters.

After changing the parameters the software may need to run up to 10 minutes before the counting accuracy is at optimum.

The software does not count correctly.

- Make sure people are passing the entire counting zone crossing both blue lines – not passing out to the left or to the right.
- If the software counts too many – lower the visual height.
- If the software counts too few – increase the visual height.

I still cannot get the software to count.

If you have followed the advice above and still cannot get the software to work, please contact the Cognimatics support team at support@cognimatics.com. Do not forget to send the archive with logs and other generated material from the page <http://<servername>/local/bicycle/.api?generate-logs>.

A. Supported cameras

Table A.1. Supported cameras

Camera model	Software module
Axis P3343-VE, 6mm	TrueView_Bicycle_x_y_ARTPEC-3__x.y.z-b.eap

Camera model	Software module
Axis P3363-VE, 6mm	TrueView_Bicycle_x_y_ARTPEC-4__x.y.z-b.eap

x.y.z is the version number of the software module and b the build number.