



# CathexisVision 3D Headcounter App-note (Discontinued)

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While Cathexis has made every effort to ensure the accuracy of this document, there is no guarantee of accuracy, neither explicit nor implied. Specifications are subject to change without notice.

## 1. Introduction

This document will detail the design, installation and configuration of the 3D People Counter system. The counting solution offers two options for counting. These are either a TopDown counter, or an Oblique view counter. The choice of one or the other is dependent on the physical dimensions of the area to be counted. A wider passage is suited to an oblique counter, whilst a smaller passage with a higher ceiling is suited to a topdown counter.

The 3D Counter is a head counter that uses a depth map in order to provide an exceedingly accurate count. (If the counter is configured & installed correctly this is typically higher than 98% for the oblique counter and 99% for the top-down counter.)

A counter system requires the following components:

- At least one CathexisVision recording server.
- At least one 3D counter – this counter has a counter head (like a camera), and is installed over the passage to be counted, and a matching processing unit which may be installed in the ceiling (this is recommended).
- A counting database that is installed on one of the CathexisVision recording servers. There is a license for the counting database and a per channel license required for the 3d counter itself (the licenses required for this are covered in more detail in the next section).

Please see the next page for license requirements.

**Note:** the 3D Headcounter is discontinued and not supported in CathexisVision 2021.

### A NOTE ON CAMERA CHANNELS

The CathexisVision software packages have **limits on camera channels**. A multi-head camera is physically a single device (camera) but it **requires a camera channel for each one of the internal cameras**. The same applies to an encoder: a 16-channel encoder will account for 16 camera channels on the CathexisVision software, even though it is a single device.

### USEFUL LINKS

To view **tutorial videos** on CathexisVision setup, visit <https://cathexisvideo.com/resources/videos>

Find answers to Cathexis **Frequently Asked Questions**: <https://cathexis.crisp.help/en/?1557129162258>

## 1.1 License requirements

The following licenses will be required:

License	Description
<b>CLIC-2000</b>	An IP camera license.
<b>CNRP-1000</b>	<p>Counting &amp; reporting base license (site-based). This enables the counting system. The counting database may reside on any of the servers on the site. One of these licenses is required per site. In addition, at least one CNRP-1001 license is required (see below).</p> <p>This CNRP-1000 license provides access to a dedicated people-counting database. Powerful reporting can be scheduled with historical or current data. Reports may be configured as line, bar or pie graphs, or the data may be exported in a text format.</p> <p>This license must reside on the server that has the PostgreSQL database installed.</p>
<b>CNRP-1001</b>	<p>Counting &amp; reporting per counter/channel license. At least one of these is required per site, and at least one CNRP-1000 (base license) mentioned above is required.</p> <p><b>Note:</b></p> <ol style="list-style-type: none"> <li>1. A CNRP-1001 license is required for each direction being counted. A door counting both forward and reverse directions will require 2 <b>CNRP-1001</b> licenses.</li> <li>2. The default counting direction is set to <i>either</i>. This will require two CNRP-1001 licenses.</li> </ol> <p>This license should reside together with the CNRP-1000 license on the counting server.</p>
<b>CANA-3001</b>	<p>This license is applied on a per camera basis, and allow:</p> <ul style="list-style-type: none"> <li>• A double line counting option to be used with the 3D Counting algorithm, which eliminates false counts where people stand in a passage right over the counting line.</li> <li>• The CANA-3001 also adds event line trigger whereby the counter can be used to trigger standard CathesisVision events. Without this license, the default counting line is only a single line.</li> </ul> <p><b>Please note:</b></p> <p>This license must be allocated to the counting camera.</p>

## 2. Device Installation

This section of the document will detail the physical installation requirements for the TopDown and Oblique camera counters using the Cathesis 3D camera hardware.

**Note:**

1. The following sections will refer to the Cathesis 3D camera hardware. This includes the 3D processing module that accompanies the 3D camera and presupposes that the 3D processing module will be installed adjacent to the 3D camera (perhaps in a ceiling or adjacent housing).
2. The Cathesis 3D camera hardware comes with a mounting bracket which allows the camera to be swivelled for both TopDown and Oblique view installations.

### 2.1 General Specifications

#### 2.1.1 3D Camera file of view

Field of View: **58° H, 45° V, 70° D** (Horizontal, Vertical, Diagonal)

Depth Specifications: **0.5m to 5.5 m** (Perpendicular from sensor)

Please note the following, which relates to the 3D camera sensor in general.

It is recommended that the entrance/doorway:

- Is not exposed to direct sunlight.
- The roof height is greater than 2.5m (particularly for the TopDown counter).
- The doorway width is less than 4m when using the TopDown counter.

### 2.2 TopDown View



This section provides the required specifications for the TopDown counter installation.

## 2.2.1 Power Requirements

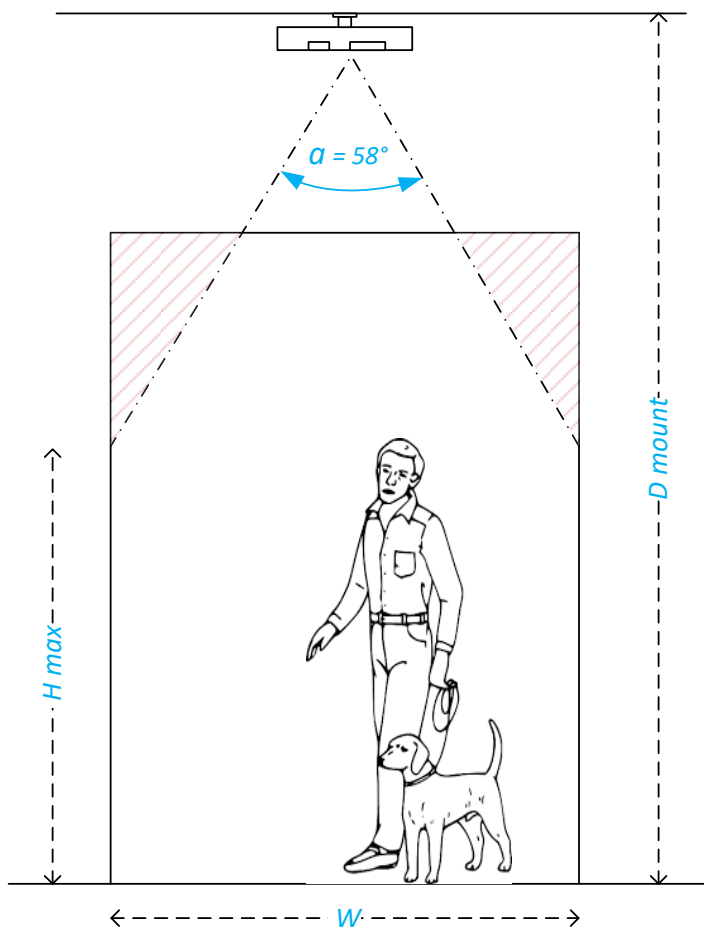
This installation requires external power, as the camera does **not** receive power over Ethernet (PoE).

The camera sensor is powered by the 3D encoder unit, which is:

- Provided with a **5 Volt (1.2 Amp) power supply**, and
- This power supply needs to connect to a **mains outlet**.

## 2.2.2 Recommended Sensor Orientation for TopDown View

The recommended installation is shown in the image below. The face of the sensor should be pointed directly downward.



### Legend

$H_{max}$  = Maximum depth capture height [m]

$D_{mount}$  = Sensor mount height [m]

$W$  = Doorway width [m]

$\alpha$  = field of view [°] =  $58^\circ$

$d_{max}$  = Maximum perpendicular depth from the sensor [m] = 5.5 m

See the following page to determine the mounting height.

## 2.2.3 Determining the Mounting Height for the TopDown Counter

The mounting point should be selected from the table below. Given the walkway width (**W [m]**) and maximum capture height (**Hmax [m]**), the corresponding mounting height can be selected. Only the provided values are recommended.

Mounting Height (Dmount) [m]									
	Hmax [m]	1.5	1.6	1.7	1.8	1.9	2	2.1	2.2
W [m]									
1.0		2.50	2.60	2.70	2.80	2.90	3.00	3.10	3.20
1.5		2.95	3.05	3.15	3.25	3.35	3.45	3.55	3.65
2.0		3.40	3.50	3.60	3.70	3.80	3.90	4.00	4.10
2.5		3.86	3.96	4.06	4.16	4.26	4.36	4.46	4.56
3.0		4.31	4.41	4.51	4.61	4.71	4.81	4.91	5.01
3.5		4.76	4.86	4.96	5.06	5.16	5.26	5.36	5.46
4.0		5.21	5.31	5.41					
4.5									

**Example:** Assuming a walkway width of 2.5m and a maximum capture height of 1.8m, a mounting height of 4.16m is recommended.

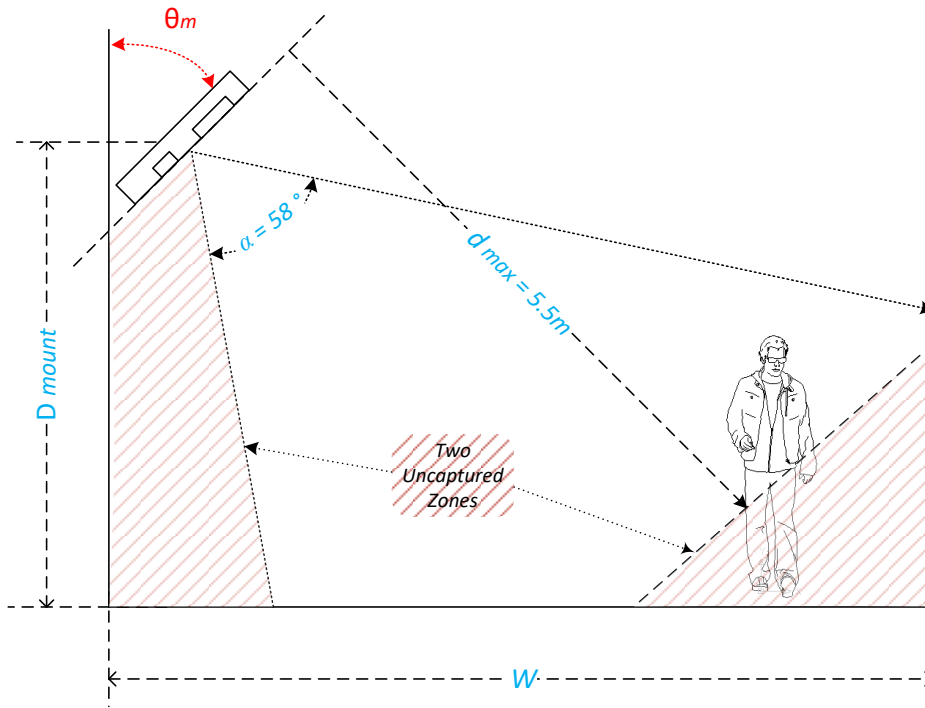
## 2.3 Oblique View

Oblique view installations are normally indoors, facing across the passage where people cross from right to left or left to right. Alternatively, Oblique view installations may be horizontal above the doorway and tilted inwards.

See the example installation image below for recommendations.

Note that there are two uncaptured zones. One close to the wall under the sensor and one additional at the bottom right where the maximum depth does not reach. Any objects fully in these regions will not be captured. The following procedure should be used to maximise head counts for provided specifications.

### 2.3.1 Recommended Sensor Orientation for Oblique View



Use the tables below for recommended installation values. **Note:** A maximum capture height of 1.8m and a minimum capture height of 1m are assumed.

#### 2.3.1.1 Uncaptured Zone Area Under Sensor [m<sup>2</sup>]

This table shows the zone area under the sensor which will not be captured according to the walkway width ( $W$  [m]) and mounting height value ( $D_{mount}$  [m]). Use the table to determine the best walkway width and mounting height values such that they produce the smallest uncaptured area.

	$D_{mount}$ [m]	1.9	2	2.5	3	3.5	4	4.5	5
$W$ [m]									
2.0		1.00	0.97	0.60	0.00	0.00	0.00	0.00	0.00
2.5		1.02	1.02	0.81	0.36	0.00	0.00	0.00	0.00
3.0		1.04	1.06	0.96	0.63	0.13	0.00	0.00	0.00
3.5		1.05	1.08	1.07	0.84	0.45	0.00	0.00	0.00
4.0		1.06	1.10	1.15	1.01	0.70	0.25	0.00	0.00
4.5		1.07	1.12	1.22	1.14	0.90	0.53	0.05	
5.0		1.07	1.13	1.27	1.25	1.07	0.77		
5.5		1.08	1.14	1.32	1.34				
5.8		1.08	1.14						

The uncaptured zone areas are gradient colour coded, displaying the **best values** (walkway width, mounting height, and uncaptured zone area) in **green**, and **the worst in red**.

**Example:** A walkway width of 4.5m would be best paired with a mounting height of 4.5m (producing an uncaptured area of 0.05m<sup>2</sup>), and the worst paired with a mounting height of 2.5m (producing an uncaptured area of 1.22m<sup>2</sup>).



### 2.3.1.2 Mounting Angle [degree]

Once the walkway width and mounting height have been selected (above), use these values to determine the mounting angle (in degrees) with the following table.

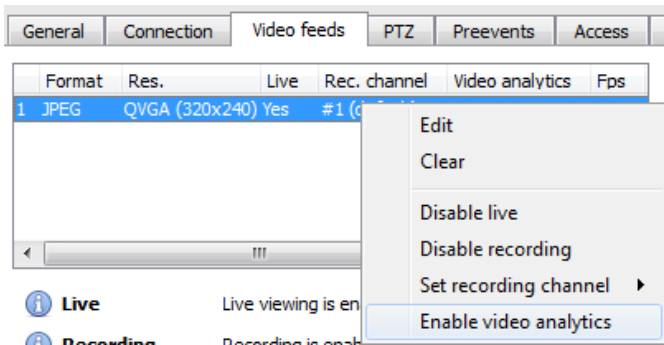
		Dmount [m]							
		1.9	2	2.5	3	3.5	4	4.5	5
W [m]	2.0	32.01	35.01	49.22	61.28	70.82	78.18	83.87	88.30
	2.5	31.39	33.76	45.26	55.57	64.31	71.51	77.37	82.13
	3.0	30.97	32.95	42.57	51.48	59.38	66.18	71.95	76.82
	3.5	30.68	32.37	40.63	48.44	55.57	61.91	67.45	72.26
	4.0	30.47	31.94	39.18	46.10	52.55	58.43	63.70	68.37
	4.5	30.30	31.60	38.04	44.26	50.12	55.57	60.53	65.03
	5.0	30.17	31.34	37.13	42.76	48.13	53.18	57.86	62.15
	5.5	30.06	31.12	36.39	41.53	46.47	51.17	55.57	59.65
	5.8	30.01	31.01	36.00	40.89	45.61	50.10	54.35	58.31

**Example:** A walkway width of 4.5m and a mounting height of 4.5m will require a **mounting angle of 60.53 degrees.**

## 3. Enable Video Analytics

### 3.1 Cameras Panel

After a camera has been added (see Setup Manual), video analytics must be enabled on it. This may be done by either editing the camera, or enabling video analytics during the camera addition process.

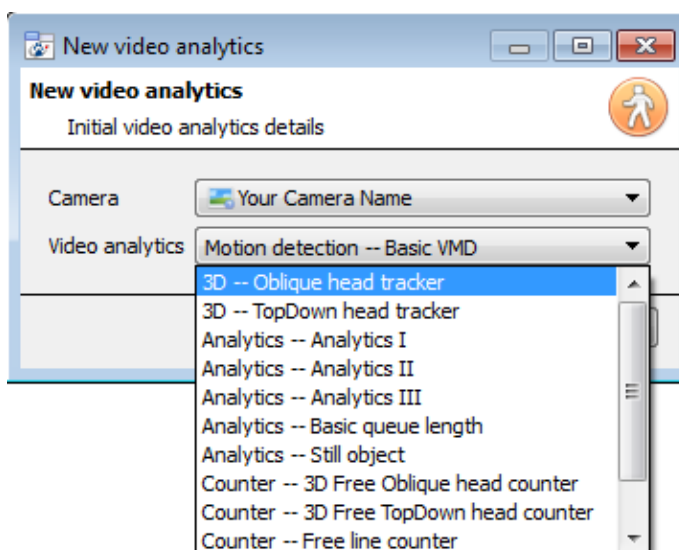


In the **Video feeds**, right click on the available feed and select **Enable video analytics**.

### 3.2 Adding Video Analytics

Please ensure that a license is available for Analytics III to use the dual counting lines and to generate event triggers. If this license is not present, then all instruction that applies to dual lines should be read in the context of the single line counter.

Navigate to **Configure Servers**  / **Video analytics**  / Click **New** .



Select the **Camera** analytics will be applied to.

Select the video analytics to apply.

**CANA 3001 Analytics license present:**

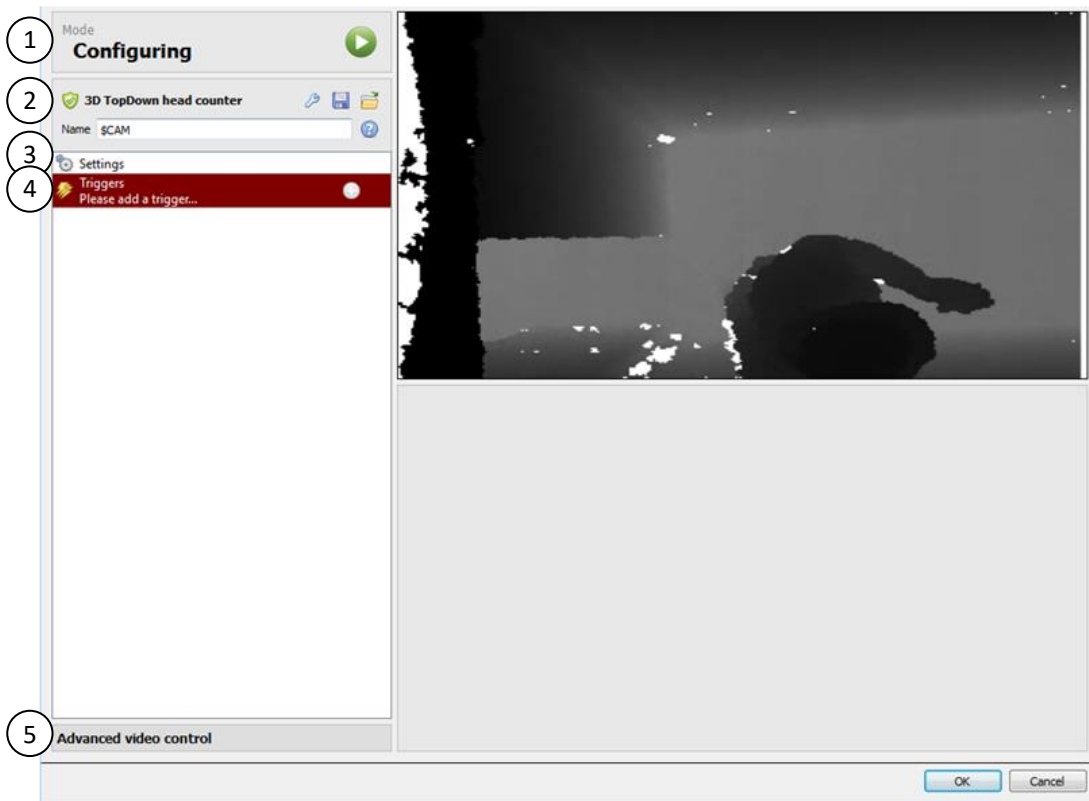
Select the 3D – Oblique head tracker  
Select the 3D – TopDown head tracker

**NO CANA 3001 license present:**

Use Counter – 3D Free Oblique head counter  
Use Counter – 3D Free TopDown head counter

## 4. Configuring Analytics Basic Interface

The configuration interface is the same for both the 3D and the 3D-free TopDown, and the 3D and the 3D-free Oblique view head counters. For more detailed information on video analytics, please consult the full setup manual.

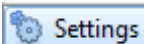


- |          |          |  |
|----------|----------|--|
| <p>①</p> |          | <p>Indicates configuration mode. Click  to switch to <b>Running</b> to test video analytics settings.</p>  |
| <p>②</p> | <br><br> | <p>Change the algorithm.</p> <p>Save algorithm settings.</p> <p>Load preconfigured algorithm settings.</p> |
| <p>③</p> |          | <p>Click for settings options to appear under camera image.</p>  |
| <p>④</p> |          | <p>Add counting triggers and events.</p>   |
| <p>⑤</p> |          | <p>Control video playback. Please consult main Setup Manual for more information.</p>                      |

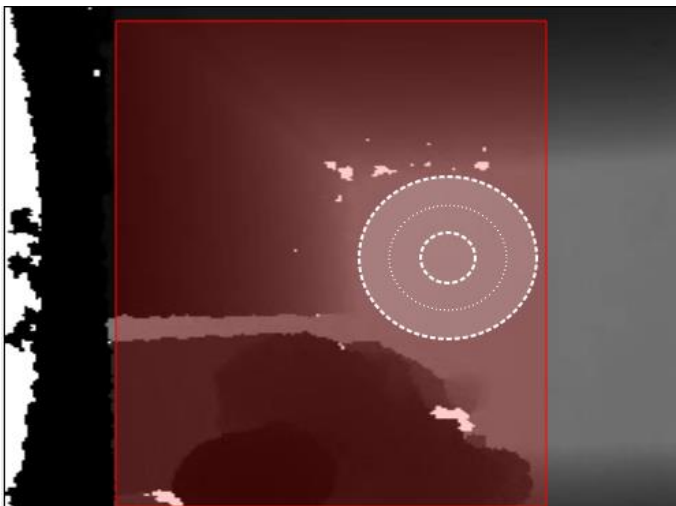
## 5. Configuring TopDown Counter Video Analytics

This section will detail configuring a TopDown head counter. This section will assume that the CANA-3001 analytics license has been applied for this camera. If the license is not available, then only a single line will be present where a double line is present with the license. These two configurations are treated identically and interchangeably in this document.

### 5.1 Settings Panel



In the left panel of the configuring video analytics window, select **Settings**. This will bring up the following options underneath the camera image, pictured below.



Use mask

Check **Use mask** to use a mask (in red) to apply the algorithm over a specific area.

Default counting overlay

Click **Default counting overlay** to configure the way the head count number will appear as an overlay on the camera image.

Below, configure the average head size to capture. These settings will reflect in the two circles on the camera image.

Use mask

Min head size: 11

Max head size: 20

Head aspect ratio: 77

Max capture height [pix]: 32

Min capture height [pix]: 240

If object touches an edge then flag it as

Left edge	Probable	Right edge	Probable
Top edge	Probable	Bottom edge	Probable

Set the **Min head size** to eliminate counting of heads which are smaller than the inner circle.

Set the **Max head size** to eliminate counting of heads which are bigger than the outer circle.

Change the **Head aspect ratio** to resemble the head shapes on the feed.

Set the **Max capture height**, measured in pixels. The grey shade shows the corresponding pixel height in the image. The algorithm will only count objects at this height or lower.

Set the **Min capture height**, measured in pixels. The algorithm will only count objects at this height or higher.

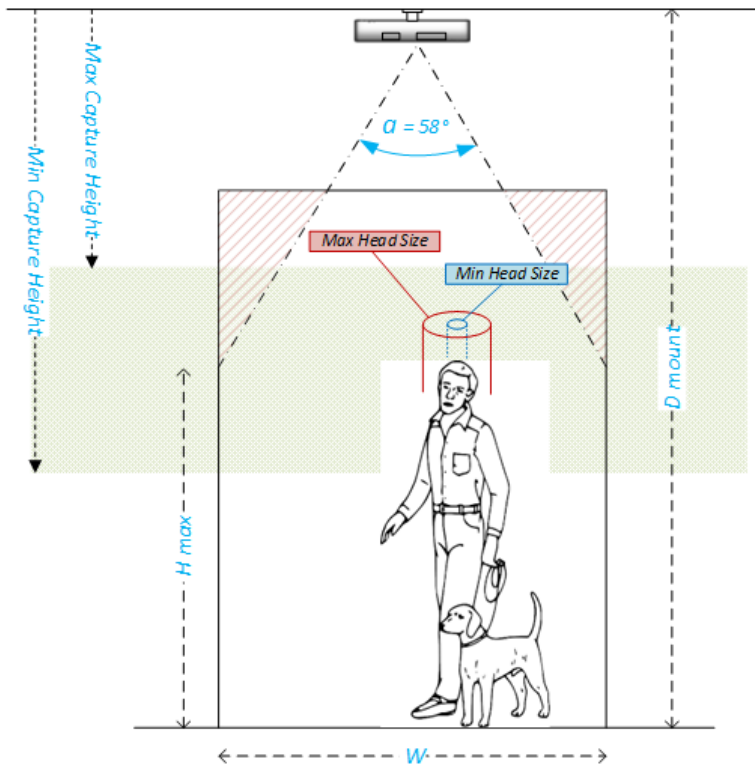
Objects may be deemed as an **Invalid**, **Probable** or **Possible** head on the edges by changing its state in these settings.

**Invalid:** Any object on an edge will not be considered a head.

**Possible:** The object is treated as default by the algorithm.

**Probable:** The object is much more likely to be considered a head.

The image below indicates how the parameters apply to the objects in the installation:

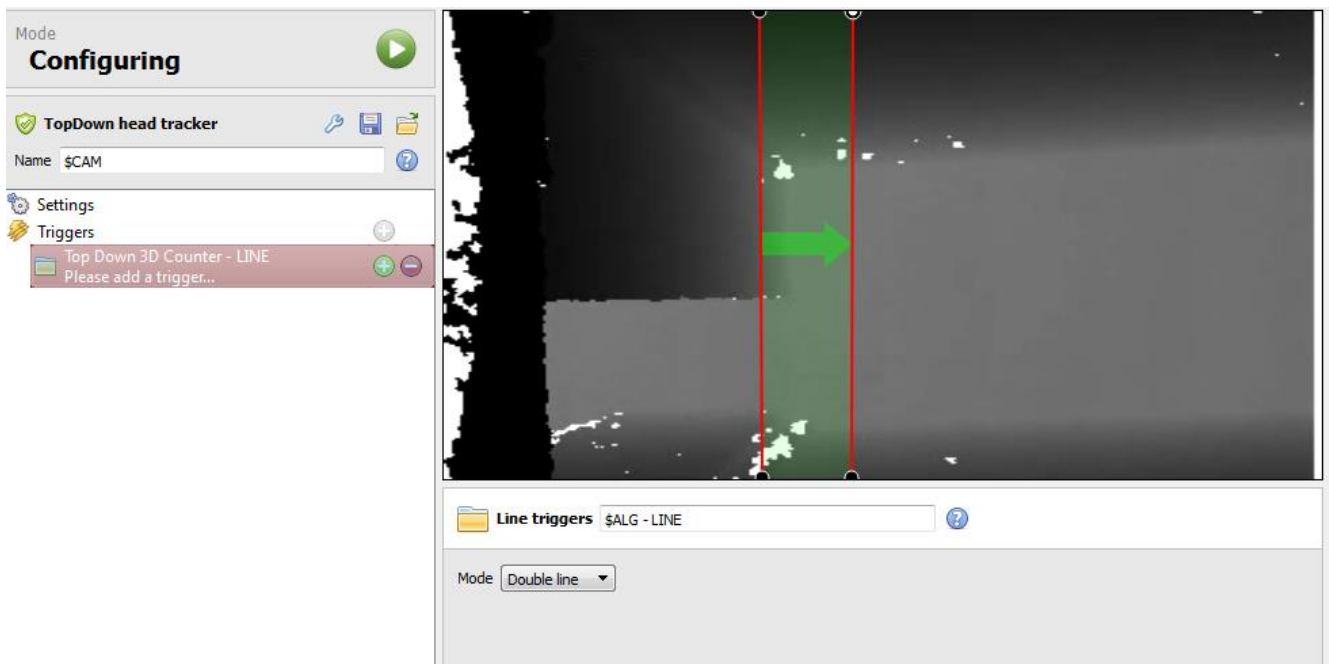


The following steps will help simplify the head counter configuration process:

1. Set the range values to cover the widest possible height of the object that is to be counted:
  - Set the Max capture height [pix] to 0 (lowest value being closest to the floor).
  - Set the Min capture height [pix] to 240 (highest value being closest to the sensor).
2. Set the head size settings
  - Set the max head size to cover the largest head possible (and some of the shoulders)
  - Set the min head size to always be slightly smaller than the smallest head
3. Incrementally decrease the Min capture height [pix] to avoid counting lower objects. In other words, raise the height off the floor to exclude everything below this height.
4. Select object edge touch settings if applicable.
  - This allows for a portion of a person crossing the periphery of the counted area to be counted.
  - There is the option to include a person on either edge or at the top or bottom of the image to be included in the count or excluded, depending on the setting.
5. Select overlay settings – this permits the display of the counts on the live & recorded video feed.
6. Finally, use the mask to select (to reduce) the area for counting (if required).

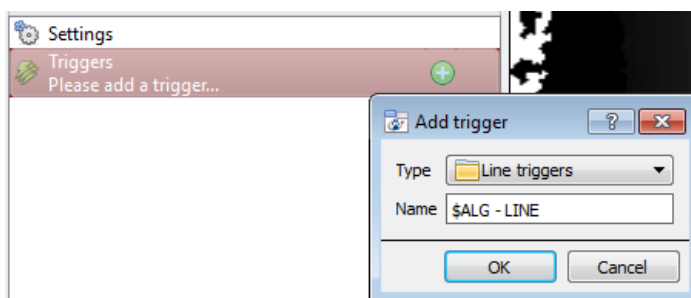
## 5.2 Triggers Panel

Having configured the algorithm – an initial attempt has been made at the correct configuration of the system. Now the triggers need to be configured. These are rules that use the algorithm and result in decisions being made (for example someone is counted). This section covers configuring these triggers or rules. Once this is complete, the configuration can be tested.




### 5.2.1 Add a Counting Line

Add a counting line that people need to cross in order to be counted. In the diagram above a double line has been configured & the person needs to cross both lines in order to be counted. If the person dwells on the one line, and then crosses back across the same line that person will not be counted. A double line assists in reducing false counts – for example when a person is cleaning some sliding doors that form the entrance to the passage and the person continually crosses the counting line.



Add at least one counting line.

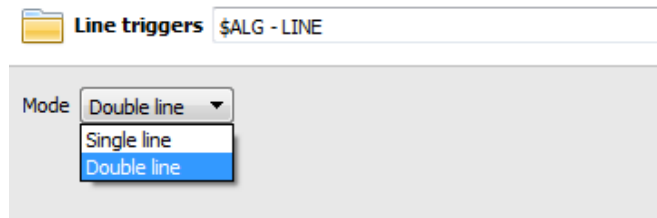
 Click the plus icon to add a counting line. Select **Line Triggers**.

 Click OK.

The line will now be added to the camera image.

### 5.2.1.1 Choose Line Mode

Select the relevant line trigger in the Configuring Panel to define its line **Mode** underneath the camera image.



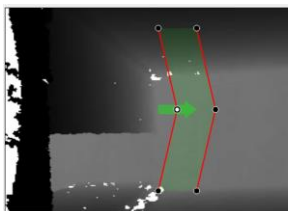
**Single line** will add a single line; people crossing this line will be counted.

**Double line** will add a double line; people will only be counted if they cross both lines (requires CANA-3001 license).

**Tip:** Add a double line to eliminate false counts which may occur when a person remains within a confined space around a line (only available with the CANA-3001 license).

### 5.2.1.2 Define the Counting Line

**Note:** This section will detail the definition of a **Double line**.



Define the line so that it covers the area where people will be counted as they cross.

#### Add nodes

Ctrl-click the red line.

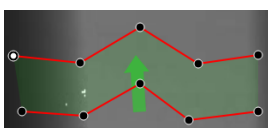
#### Remove nodes

Double-click on the node to be removed.

#### Move the Line

Click anywhere on the red line to drag the counting line around.

#### Angle the Line



Click on a node and drag it to the desired position.

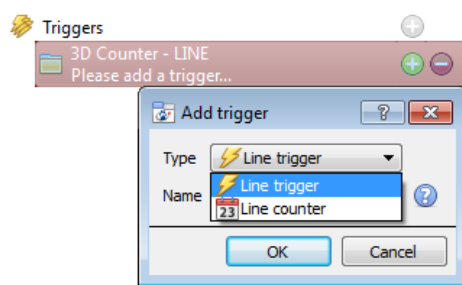
## 5.2.2 Add a Trigger or a Counter

If the CANA-3001 license has been applied, either a line trigger or a line counter may be added, or both.

### 5.2.2.1 Add a Trigger

Adding a trigger to the counting line will enable the setup of CathesisVision events which will trigger when the line is crossed. **This is available only if the CANA-3001 license has been purchased.** If a trigger is configured, then this trigger will be made available in the event configuration as a valid trigger. This trigger may be used to generate recordings, switch cameras to displays or alarm to a central monitoring station.

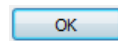
**Note:** The event configuration is not covered in this application note as it is a general function of the Cathesis Vision system. Please refer to the full **Setup Manual** for event configuration setup.



Select the newly added **TopDown 3D Counter - LINE**.



Click the plus icon and select **Line trigger**.



Click OK.

**Note:** Multiple triggers may be added to a line.

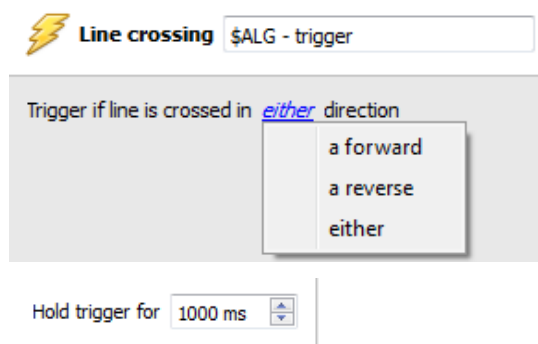
### Define Direction of Trigger

Once added, define which directions will trigger a count. The default direction is set to **Either**. Select the trigger in the left panel, and options will appear underneath the camera image.

**Note:**

A CNRP-1001 license is required for each direction being counted. Two CNRP-1001 licenses are required if using the default direction setting of *either*.

Click the blue hyperlink.



**Forward** will trigger events if people cross the line in the same direction of the arrow.

**Reverse** will trigger events if people cross the line in the opposite direction of the arrow.

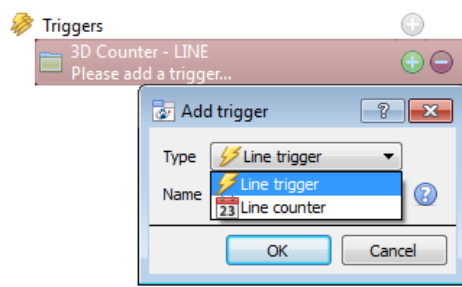
**Either** will trigger events if people cross in either direction.

Set the **Hold trigger** time to extend the event by this amount after the trigger has terminated.

**Note:** If multiple triggers have been added, define the trigger directions for each trigger.



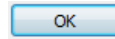
### 5.2.2.2 Add a Counter



Select the newly added **TopDown 3D Counter - LINE**.



Click the plus icon and select **Line counter**.

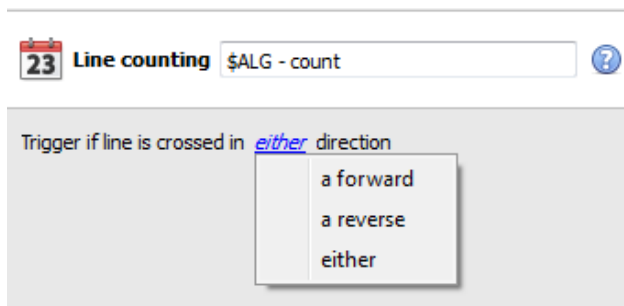


Click OK.

**Note:** Multiple counters may be added to a line.

### Define Counter

Once added, define which directions will trigger a count. The default direction is set to **Either**. Select the counter in the left panel, and options will appear underneath the camera image.



**Forward** will trigger counts if people cross the line in the same direction of the arrow.

**Reverse** will trigger counts if people cross the line in the opposite direction of the arrow.

**Either** will trigger counts if people cross in either direction.

**Note:** Licenses are required for each direction being counted. Please consult the License Requirements section at the beginning of this document for details.

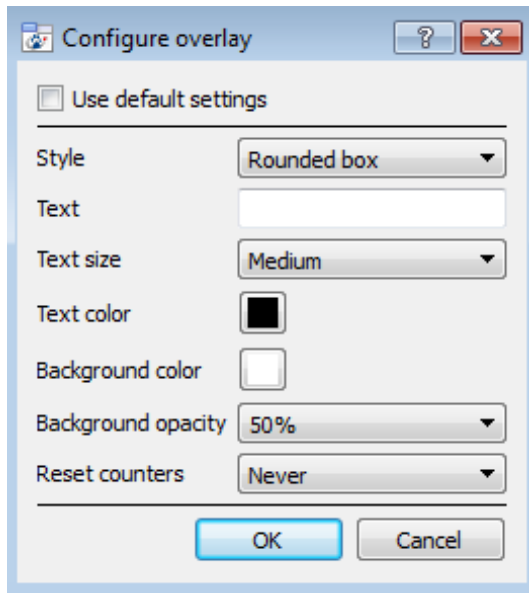
### 5.2.2.3 Configure Line Counting Overlays

Overlays allow the visual display of the counts on the live and recorded data. This is useful to identify whether a count occurred and how many counts occurred. These counts are also overlaid on the recorded footage.

**Overlay** Check the **Overlays** box to display the overlays for the selected counter on the camera image.



Click the settings icon to bring up the count overlay settings dialogue.



Check box to **Use default settings**.

Choose the **Style** of the count overlay.

Set **Text** to appear before the count number.

Select **Text size** and **colour**.

Select **Background colour** of the overlay.


Set the **Opacity of the background** colour.

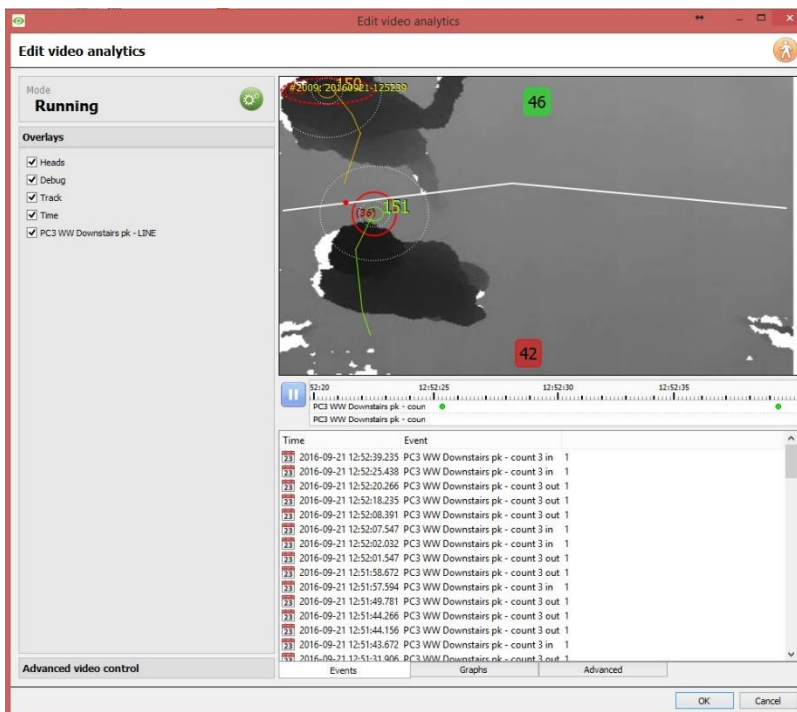
Decide when to **Reset counters**.

Click  when finished.

### 5.2.3 Testing the Configuration

Once the initial configuration has been done, the performance of the counting system should be evaluated. This is achieved using the algorithm test mode.

 Press the play button to enter the test mode.



Check the overlay tick boxes to enable the overlays.

These overlays provide debug information that enable the algorithm to be tuned, by altering the settings discussed in the above **Settings Panel** section.

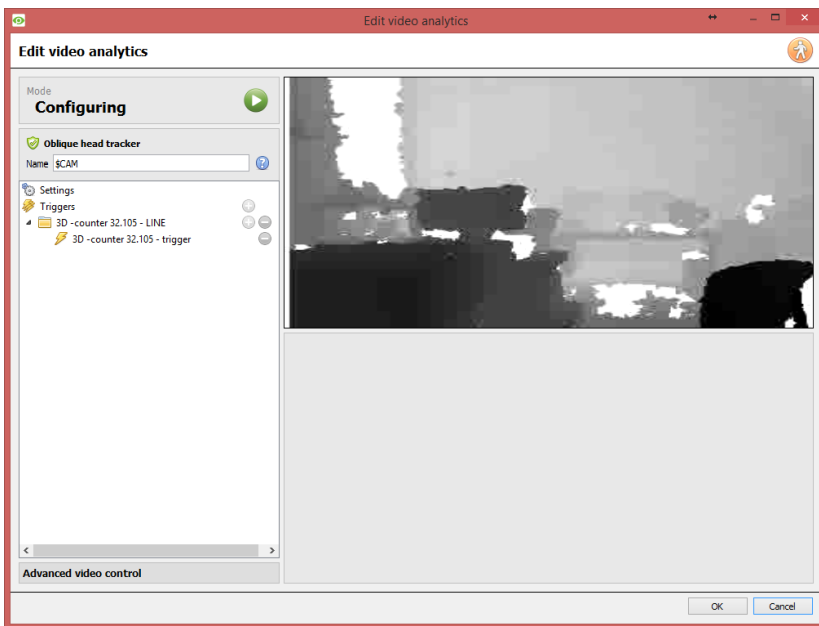
These overlays are also available in the live video feed and on the recorded video in Cathesis Vision system.

The recorded video may be used to evaluate the performance of the counting system. The user may turn some (or all) of these overlays on when required.

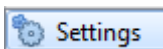
## 6. Configuring Oblique View Counter Video Analytics

This section will detail the configuration of an Oblique head counter. The oblique head counter is intended for passages or doors that are typically wider, such that a TopDown counter camera cannot be mounted high enough (because of a low ceiling) so that the full door is adequately covered. The algorithm selected during the setup process, is the oblique head tracker.

**Note:** This section will assume that the **CANA-3001 analytics license** has been applied for this camera. If the license is not available, then only a single line will be present where a double line is present with the license. Equally the option to trigger an event will not be available. Otherwise, these two configurations are treated identically and interchangeably in this document.


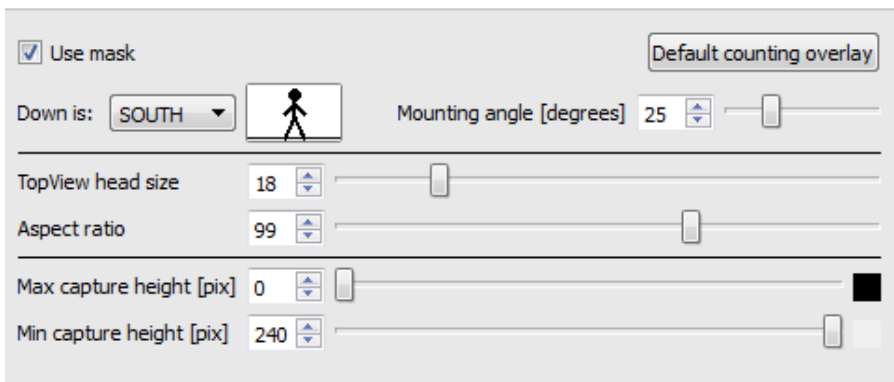


### 6.1 Settings Panel



In the left panel of the configuring video analytics window, select Settings. This will bring up the options underneath the camera image, pictured below.




**Settings**

 Use mask

Check **Use mask** to apply a mask (in red) over the algorithm area.

Click **Default counting overlay** to configure the way the head count number will appear as an overlay on the camera image.

The configuration of the 3D oblique counter is less intuitive than the TopDown counter. It must be recalled that the field of view of the camera is non symmetrical:

- The camera has a field of view that is **58° horizontal relative to the camera**,
- And **45° Vertical relative to the camera**.

The image shown in the displays above is the direct image from the camera and rendered in a manner that a human can perceive (the camera actually being a depth sensor). In some cases, it makes sense to mount the camera horizontally with the field of view as indicated above (58 horizontal & 45 vertical), but in some installations it makes sense to mount the camera vertically (and then the vertical field of view becomes the horizontal – i.e. 45 degrees, and the horizontal becomes the vertical – i.e. 58 degrees).

The calibration of the “Down angle” in the settings shown above, allows the user to orientate the camera and the algorithm, by indicating where the floor and the roof are relative to the image displayed. So a calibration of:

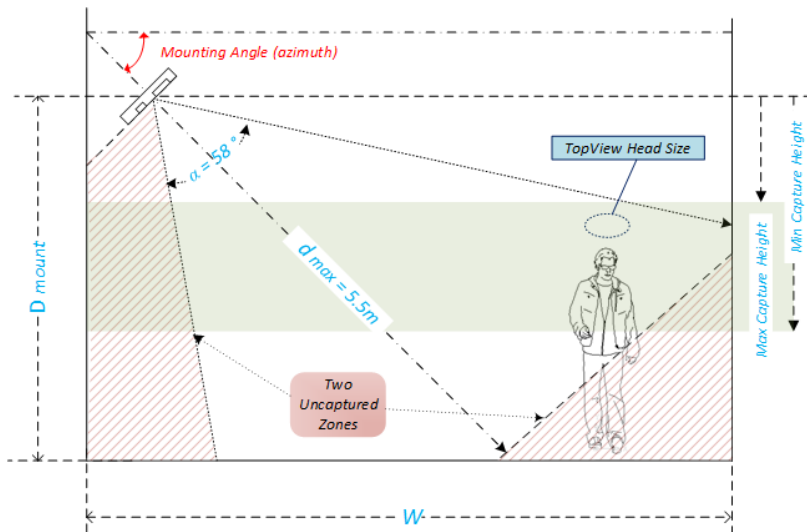
- North: means the roof is at the top of the image and the floor at the bottom.
- South: means the floor is at the top and the roof at the bottom
- East: means that floor is on the right and the roof on the left.
- West: means that floor is on the left and the roof on the right.

Input the **Mounting angle** of the camera. This is measured in degrees and is the azimuth, in other words the angle that the camera is tilted down from the ceiling. Twenty-five degrees is a typical angle, but this is dependent on the installation. See diagram below.

Set the **TopView head size** to match the average size of head. Changing this value will increase/decrease the size of the circle in the algorithm area.

Set the **Max capture height** to eliminate counting of heads above this height.

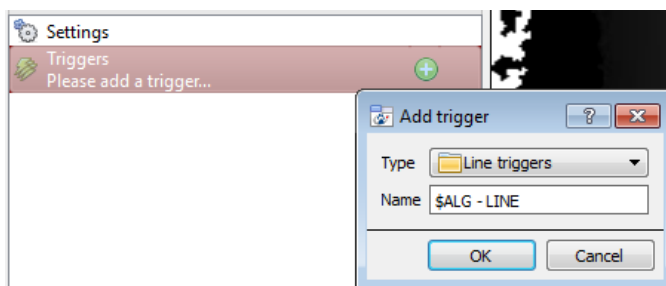
Set the **Min capture height** to eliminate counting of heads below this height.



## 6.2 Triggers Panel

Having configured the algorithm – an initial attempt has been made at the correct configuration of the system. Now the triggers need to be configured. These are rules that use the algorithm and result in decisions being made (for example someone has been counted). This section covers configuring these triggers or rules. Once this is complete, the configuration can be tested.

### 6.2.1 Add a Counting Line



Add at least one counting line.

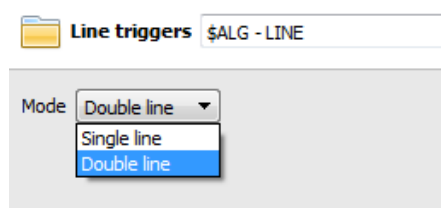
Click the plus icon to add a counting line. Select **Line Triggers**.

Click OK.

The line will now be added to the camera image.

#### 6.2.1.1 Choose Line Mode

Select the relevant line trigger in the Configuring Panel to define its line **Mode** underneath the camera image.



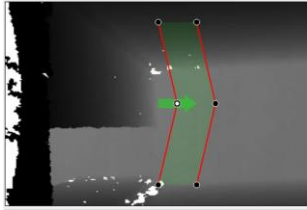
**Single line** will add a single line; people crossing this line will be counted.

**Double line** will add a double line; people will only be counted if they cross both lines. This will only be available if the CANA-3001 license has been installed.

**Tip:** Add a double line to eliminate false counts which may occur when a person remains within a confined space around a line.

### 6.2.1.2 Define the Counting Line

**Note:** This section will detail the definition of a Double line; for instruction on defining a single line, please see [Section 3b](#), above.



Define the line so that it covers the area where people will be counted as they cross.

#### Add nodes

Ctrl-click the red line.

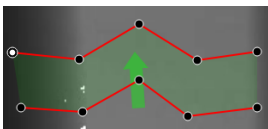
#### Remove nodes

Double-click on the node to be removed.

#### Move the Line

Click anywhere on the red line to drag the counting line around.

#### Angle the Line



Click on a node and drag it to the desired position.

If using the licensed algorithm, either a line trigger or a line counter may be added, or both.

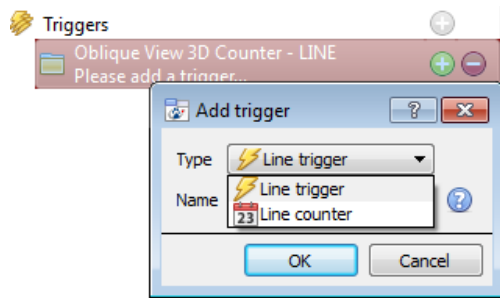
## 6.2.2 Add a Trigger or a Counter

If the CANA-3001 license has been applied, either a line trigger or a line counter may be added, or both.


### 6.2.2.1 Add a Trigger

Adding a trigger to the counting line will enable the setup of CathesisVision events, which will trigger when the line is crossed. **This is available only if the CANA-3001 license been purchased.** If a trigger is configured, then this trigger will be made available in the event configuration as a valid trigger.

**Note:** The event configuration is not covered in this application note as it is a general function of the CathesisVision system. Please refer to the main **Setup Manual** for event configuration setup.



Select the **Oblique View 3D Counter - LINE**.

 Click the plus icon and select **Line trigger**.

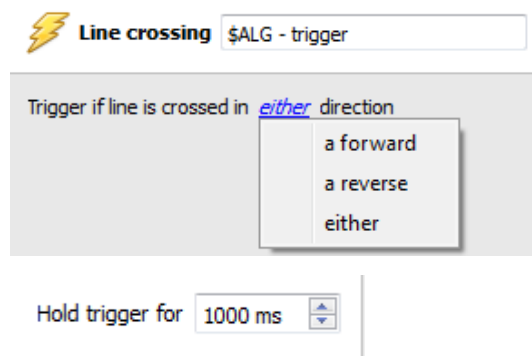
 Click OK.

**Note:** Multiple triggers may be added to a line.

Once added, select the trigger to define further trigger options.

### 6.2.2.2 Define Trigger

Once added, define which directions will trigger a count. The default direction is set to **Either**. Select the trigger in the left panel, and options will appear underneath the camera image.



**Forward** will trigger events if people cross the line in the same direction of the arrow.

**Reverse** will trigger events if people cross the line in the opposite direction of the arrow.

**Either** will trigger events if people cross in either direction.

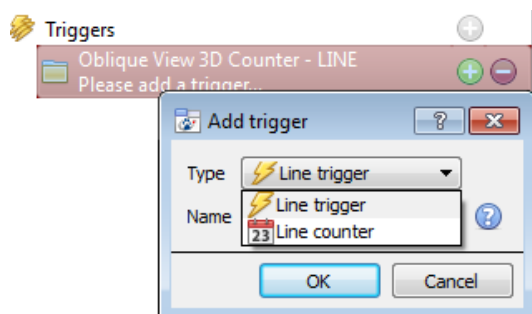
Set the **Hold trigger** time to extend the event by this amount after the trigger has terminated.

**Note:** It is not recommended to set the hold time to less than 300ms, as the head may not be counted.

**Note:**

1. If multiple triggers have been added, define the trigger directions for each trigger.
2. A **CNRP-1001 license** is required for each direction being counted. Two **CNRP-1001 licenses** are required if using the default direction setting of *either*.

### 6.2.2.3 Add a Counter



Select the **Oblique View 3D Counter - LINE**.

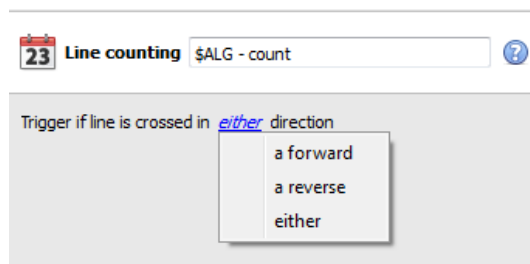
 Click the **plus icon** and select **Line counter**.

 Click OK.

**Note:** Multiple counters may be added to a line.

## Define Counter

Once added, define which directions will trigger a count. The default direction is set to **Either**. Select the counter in the left panel, and options will appear underneath the camera image.



**Forward** will trigger counts if people cross the line in the same direction of the arrow.

**Reverse** will trigger counts if people cross the line in the opposite direction of the arrow.

**Either** will trigger counts if people cross in either direction.

### Note:

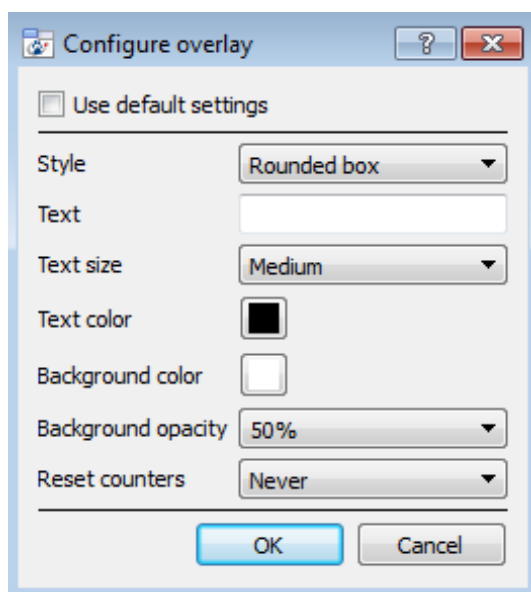
1. If multiple triggers have been added, define the trigger directions for each trigger.
2. A **CNRP-1001 license** is required for each direction being counted. Two **CNRP-1001 licenses** are required if using the default direction setting of *either*.

### 6.2.2.4 Configure Line Counting Overlays

**Overlay** Check the **Overlays** box to display the overlays for the selected counter on the camera image.



Click the settings icon to bring up the count overlay settings dialogue.



Check box to **Use default settings**.

Choose the **Style** of the count overlay.

Set **Text** to appear before the count number.

Select **Text size** and **colour**.

Select **Background colour** of the overlay.

Set the **Opacity of the background** colour.

Decide when to **Reset counters**.

Click  when finished.



## 6.2.3 Testing the Configuration

Having configured the oblique counter, the performance of the counting system needs to be evaluated. This is achieved using the algorithm test mode.

- ▶ Press the arrow button to enter the test mode.



Check the overlay tick boxes to enable the overlays. These overlays provide debug information that enables the algorithm to be tuned, by altering the settings discussed in the section above, titled “Settings panel”.

With the oblique counter it is useful to see the transformed oblique view, which makes it much easier to assess the performance of the counting.

Select the advanced pane and enable the live views for the “Filtered height map” and the “Topview of Heads”.

Having assessed the counting performance tune the “Top view head size”, “Aspect ratio” and “Min & “Max capture heights” to match. This might be an iterative process.

## 7. Testing Video Analytics

Aspects of testing have been covered individually under the configuration of the top down and oblique views. This section re-iterates this. Once the algorithm setup is complete, test how the algorithm runs before adding it to a camera.



In the configuration window, click the arrow to switch to **Running**.



Click the gear icon to switch back to Configuration in order to adjust settings (if needed).

Edit video analytics

### Edit video analytics

Mode: **Running**

**Overlays**

- Heads
- Debug
- Track
- 3D Topdown - LINE

Time	Event
2016-08-15 16:03:43.142	3D Topdown - count 1
2016-08-15 16:03:22.409	3D Topdown - count 1
2016-08-15 16:03:13.922	3D Topdown - count 1

Advanced video control

High res feed

Mon 15 Aug 16:03:43

Events | Graphs | Advanced

OK Cancel

Checking **Heads** will capture the head in red, and indicate the size, measured in pixels.

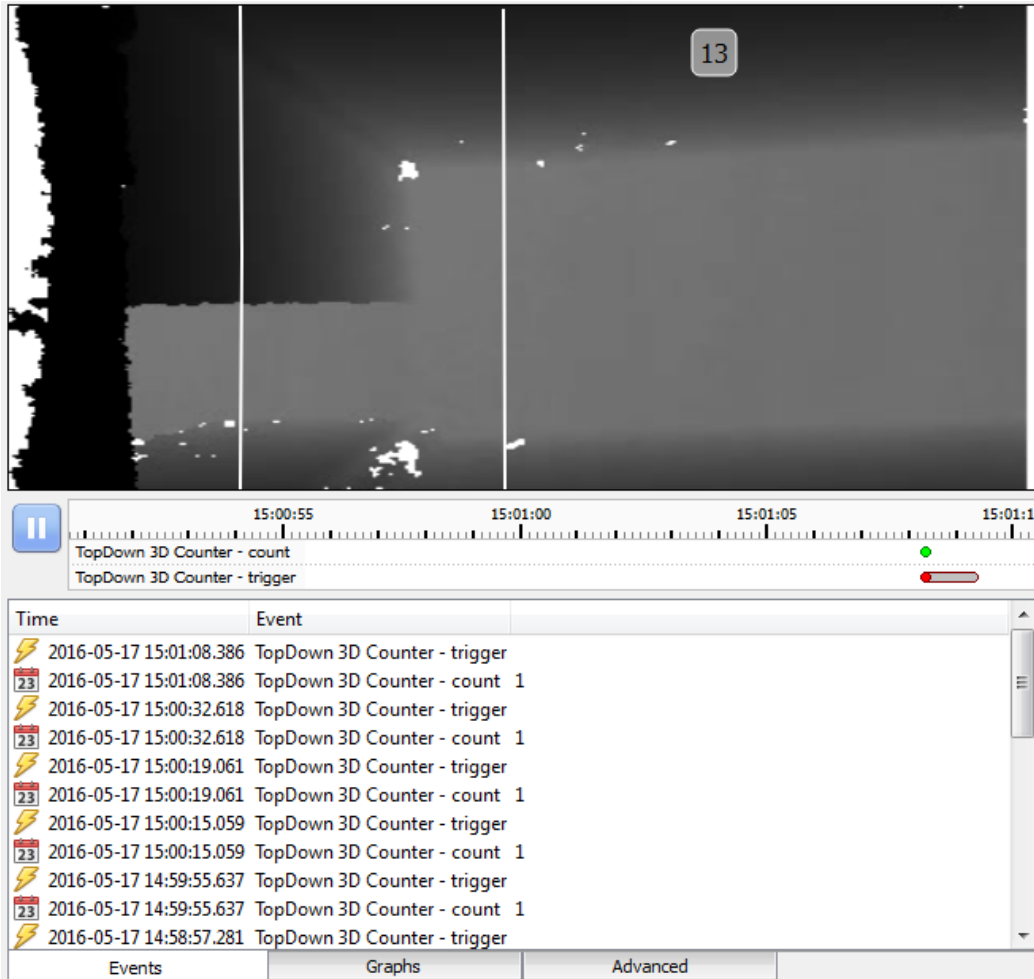
Checking **Debug** will display the head capture size circles set up in the configuration stage.

Checking **Track** will track the movement of the heads across the camera image with a line.

Checking any of the added **Lines** will display them.

## 7.1 Events Panel

Counts and triggers which have been set up will appear in the **Events Panel**.



To view an event on the timeline and in the camera image, **pause the video**. From there, select the event entry, or click on the event icon in the playback timeline.

### 7.1.1 Event icons

The triggers and counts set up in the previous section will be displayed on the playback timeline at the time of the count.



This is the trigger icon. The length of the icon will change depending on the trigger hold time setup during configuration phase. I.e., this trigger is set to hold for 1000ms, but if set to hold for 300ms it would look like this:



This is the count icon. It will appear only to denote that a head has been counted.

## 7.2 Graphs Panel

The graphs panel is not used by this algorithm. For information on creating graphs and reports, please see the **Reports Section**.

## 7.3 Advanced Panel

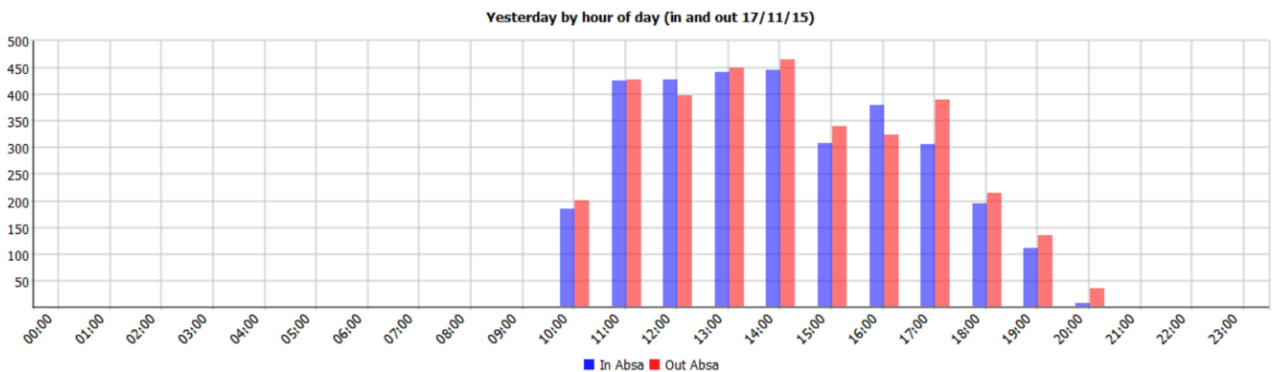
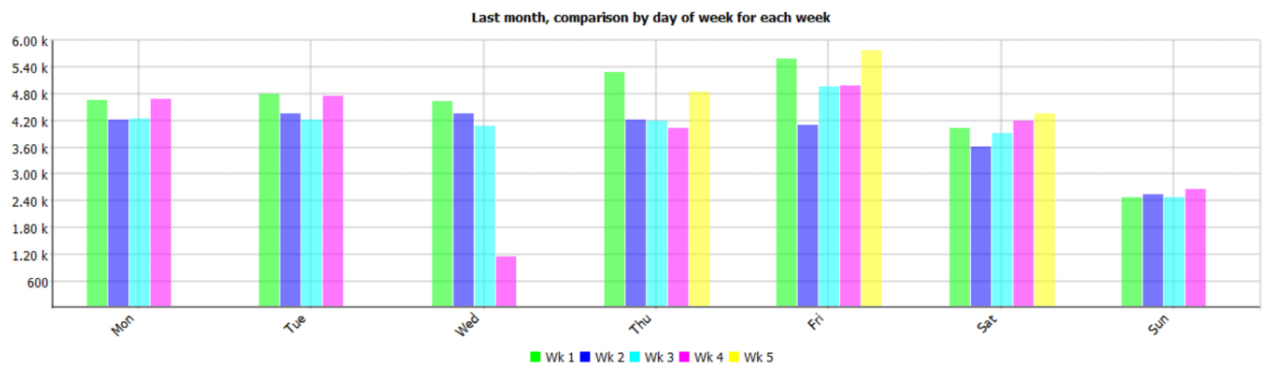
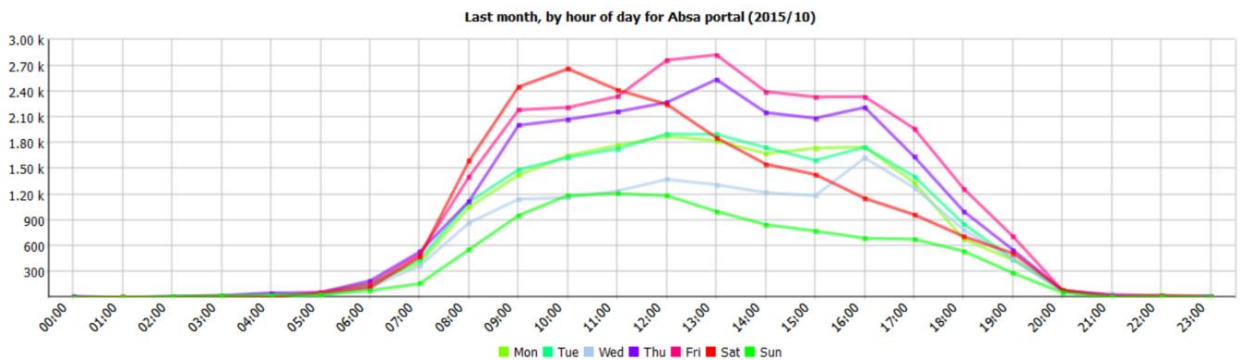
In the advanced panel, confirm that the capture height and head size settings (configured in the Configuration state) is correct for the installed distance by using the debug windows.

## 8. Reports

Currently, counting reports are generated by Cathesis and supplied to the client. Thus, to generate a report of counts over a specific time period, please contact [support@cat.co.za](mailto:support@cat.co.za) with detailed reporting requirements.

### 8.1 Report Examples

Below are some examples of the kind of reports that can be generated for the user:



Yesterday by hour of day (in and out 17/11/15)		
When	In Absa	Out Absa
00:00	0	0
01:00	0	0
02:00	0	0
03:00	0	0
04:00	0	0
05:00	0	0
06:00	0	0
07:00	0	0
08:00	0	0
09:00	0	0
10:00	190	206
11:00	430	431
12:00	432	402
13:00	445	454
14:00	450	470
15:00	313	344
16:00	384	328
17:00	311	393
18:00	199	219
19:00	116	139
20:00	12	41
21:00	0	0
22:00	0	0
23:00	0	0
<b>Total</b>	<b>3.28 k</b>	<b>3.42 k</b>

## 9. Conclusion

Please note that this app-note was designed to deal specifically with the 3D Headcounter. For further information about the CathesisVision software, please consult the main manual (<http://cathesisvideo.com/>).

For support, contact [support@cat.co.za](mailto:support@cat.co.za).