COPYRIGHT NOTICE

This document is copyright protected and is the property of Axis Communications AB and may not be copied, reproduced or distributed in any way without the prior written consent of Axis Communications AB.

VAPIX® LICENSE AGREEMENT

This VAPIX® License Agreement ("License") is a legal agreement between you (either individual or an entity) and Axis Communications AB ("Axis"). By using the INTERFACE and INTERFACE DESCRIPTION (each defined below), whether in whole or in part, you agree to be bound by the terms of this License.

1. GRANT OF LICENSE

Axis hereby grants to you the right to use the AXIS VAPIX application programming interface ("INTERFACE") and the written specification of the INTERFACE (the "INTERFACE DESCRIPTION") for the sole and limited purpose of creating, manufacturing and developing a solution that integrates any unit or portion included in the product range of Axis network products, as defined by Axis at its discretion (an "Axis Product") and to market, sell and distribute any such solution.

2. COPYRIGHT

The INTERFACE and the INTERFACE DESCRIPTION are owned by Axis and are protected by copyright laws and international treaty provisions. Any use of the INTERFACE and/or INTERFACE DESCRIPTION outside the limited purpose set forth in Section 1 above is strictly prohibited.

3. RESTRICTIONS ON USE

You have no rights with respect to the INTERFACE, INTERFACE DESCRIPTION or any portions thereof and shall not use the INTERFACE, INTERFACE DESCRIPTION or any portion thereof except as expressly set forth herein. You may not reverse engineer, decompile, or disassemble the INTERFACE except to the extent required to obtain interoperability with other independently created computer programs as permitted by mandatory law.

4. THIRD PARTY RIGHTS

You agree that you are fully responsible for your own conduct while using the INTERFACE and integrating any Axis Products into your solution and the consequences thereof. Axis Products may be combined with a virtually infinite number of potential solutions. Consequently, you recognize that (i) other third parties may claim to own patents or copyrights that could cover certain solutions which integrate Axis products, or which result from the combination of Axis products and additional technology or solutions and (ii) you are responsible for ensuring that any solution which integrates with an Axis Product, or a combination of a solution and an Axis product, does not infringe upon or misappropriate any intellectual property or personal right of any third party.

5. TERMINATION

This License is effective until terminated. Your rights under this License will terminate automatically without notice from Axis if you fail to comply with any term(s) of this License. Upon

Rev: 4.1, Last updated: 16/07/2013

2
the termination of this License, you shall cease all use and disposition of the INTERFACE and/or INTERFACE DESCRIPTION whether for the purpose set forth in Section 1 above or not.

6. REPRESENTATIONS AND WARRANTIES; DISCLAIMER

6.1. You represent and warrant that (i) any solution created, manufactured and/or developed by you which integrates an Axis Product shall not infringe or otherwise violate any third party rights, including but not limited to third party intellectual property rights; and (ii) your use of the INTERFACE and INTERFACE DESCRIPTION will comply with all applicable foreign and domestic laws, rules and regulations.

6.2. YOUR USE OF THE INTERFACE IS AT YOUR SOLE RISK. THE INTERFACE AND THE INTERFACE DESCRIPTION ARE DELIVERED FREE OF CHARGE AND "AS IS" WITHOUT WARRANTY OF ANY KIND. THE ENTIRE RISK AS TO THE USE, RESULTS AND PERFORMANCE OF THE INTERFACE AND THE INTERFACE DESCRIPTION IS ASSUMED BY THE USER/YOU. AXIS DISCLAIMS ALL WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, NON-INFRINGEMENT AND PRODUCT LIABILITY, OR ANY WARRANTY ARISING OUT OF ANY PROPOSAL, SPECIFICATION OR SAMPLE WITH RESPECT TO THE INTERFACE AND THE INTERFACE DESCRIPTION. Without limiting the generality of the foregoing, you acknowledge and agree that Axis does not make any representation or warranty that the integration of Axis Products into your solution does not infringe any third party rights. You are solely responsible for any intellectual property infringement claims that are based on or relate to solutions created, manufactured and distributed by you which integrate Axis Products. Axis is unaware of the details regarding your particular solution, has not conducted any investigation relating to potential third party rights issues relating to your solution and does not accept any responsibility or liability with respect thereto.

6.3. THIS LICENSE DOES NOT CONVEY ANY LICENSE TO THIRD PARTY INTELLECTUAL PROPERTY. YOU ARE SOLELY RESPONSIBLE FOR (I) EXAMINING WHETHER THE INTERFACE AND THE INTERFACE DESCRIPTION ARE ENCUMBERED BY OR INFRINGES UPON A RIGHT HELD BY A THIRD PARTY AND (II) ANY INTELLECTUAL PROPERTY INFRINGEMENT CLAIMS THAT ARISE OUT OF OR RELATE TO SOLUTIONS CREATED, MANUFACTURED AND DISTRIBUTED BY YOU WHICH INTEGRATE AXIS PRODUCTS.

7. LIMITATION OF LIABILITY

7.1. AXIS SHALL NOT BE LIABLE FOR LOSS OF DATA, LOSS OF PRODUCTION, LOSS OF PROFIT, LOSS OF USE, LOSS OF CONTRACTS OR FOR ANY OTHER CONSEQUENTIAL, ECONOMIC OR INDIRECT LOSS WHATSOEVER IN RESPECT OF USE OR DISPOSITION OF THE INTERFACE AND THE INTERFACE DESCRIPTION.

7.2. AXIS TOTAL LIABILITY FOR ALL CLAIMS IN ACCORDANCE WITH THE USE OF THE INTERFACE AND THE INTERFACE DESCRIPTION SHALL NOT EXCEED THE PRICE PAID FOR THE INTERFACE AND THE INTERFACE DESCRIPTION.

7.3. YOU UNDERTAKE NOT TO PURSUE ANY CLAIMS WHATSOEVER AGAINST AXIS OR ITS AFFILIATES RELATING TO OR EMANATING FROM THE INTERFACE AND THE INTERFACE DESCRIPTION OR YOUR INTEGRATION OF AN AXIS PRODUCT INTO YOUR SOLUTION.
8. INDEMNIFICATION

You will indemnify and hold Axis, its subsidiaries, affiliates, officers, employees, and agents harmless from any and all claims, damages, losses, liabilities, actions, judgments, costs, and expenses brought by a third party, including claims for infringement of intellectual property rights, arising out of or in connection with (i) your use of the INTERFACE or INTERFACE DESCRIPTION other than in accordance with the terms of this agreement, and/or (ii) any solution created, manufactured and/or developed by you which integrates an Axis Product.

9. GOVERNING LAW

This agreement shall be deemed performed in and shall be construed by the laws of Sweden. All disputes in connection with this agreement shall be finally settled by arbitration in accordance with the Rules of the Arbitration Institute of the Stockholm Chamber of Commerce. The place of arbitration shall be Malmö, Sweden. The language of the proceedings, documentation and the award shall be English.
TABLE OF CONTENTS

INTRODUCTION 6

1 APPLICATION OVERVIEW 6

1.1 Supported Products 6

1.2 Comparison with Built-in Motion Detection 6

1.2.1 AXIS Video Motion Detection 2.1 Pros 6

1.2.2 Built-in Motion Detection Pros 6

1.3 Recommendations 7

2 REFERENCES 7

3 SETUP 7

3.1 Prerequisites 7

3.2 Download Application 7

3.3 Upload to Product 7

3.4 Application Control 8

3.5 List Installed Applications 9

3.6 Application Configuration 9

3.6.1 Get Configuration 9

3.6.2 Modify Configuration 9

4 EVENT HANDLING 10

4.1 Get Event Declaration 10

4.1.1 GetEventInstances 10

4.1.2 Event Declaration Syntax 10

4.1.3 AXIS Video Motion Detection 2.1 Event Declaration 11

4.2 Subscribe to Event Notification 12
Introduction

This document describes how to use VAPIX® interface to integrate AXIS Video Motion Detection 2.1 application into your own application step by step. Please refer to [1] for detailed information about each API call.

1 Application Overview

AXIS Video Motion Detection 2.1 is a generic video motion detection application installable on Axis network cameras and encoders that support AXIS Camera Application Platform. The application is designed to work in most indoor and outdoor installations and in variable light conditions.

AXIS Video Motion Detection 2.1 aims to reduce storage and bandwidth needs for cameras mounted in low-traffic areas, detecting objects such as persons and vehicles that enter an Area-of-Interest (AOI). The application is perfect for many types of scenarios that have long period of “static” (non-motion) scenes e.g. parking lots, garage, back yards, warehouse, corridors, rooms, etc.

1.1 Supported Products

AXIS Video Motion Detection 2.1 can be used on Axis cameras and encoders using firmware 5.40 or later that also supports AXIS Camera Application Platform.

1.2 Comparison with Built-in Motion Detection

AXIS Video Motion Detection 2.1 and the built-in Motion Detection in the cameras differ in algorithm, configuration, user interface and API.

1.2.1 AXIS Video Motion Detection 2.1 Pros

- AXIS Video Motion Detection 2.1 uses object detection, and not just detecting pixel changes. This reduces false triggers due to low light scenarios and global light changes, e.g. lights on/off and sun/cloud variations.
- AXIS Video Motion Detection 2.1 allows more complex shape of an AOI (polygon with 20 points).
- AXIS Video Motion Detection 2.1 has no additional parameters besides defining the AOI. This makes the installation and configuration very quick and easy, even for laymen.

1.2.2 Built-in Motion Detection Pros

- Built-in Motion Detection allows configuring multiple AOI. However, this has low practical value as multi windows are in most cases used to create a more complex AOI.
- Built-in Motion Detection allows possibility to fine tune sensitivity. However, this fine tuning takes a lot of time and may also make things worse when the light conditions changes over the day. It is very hard to find a configuration that works for variable light.
- Built-in Motion Detection algorithm is faster to detect scene variations (50ms), while AXIS Video Motion Detection 2.1 may require 400ms to detect a moving object. This difference can be ignored if pre-event recording (1~10 seconds) is configured in the video management system.
- Built-in Motion Detection won’t be removed from the camera if a reset to factory default is performed, but AXIS Video Motion Detection 2.1 will be.
1.3 Recommendations

It is not recommended to run AXIS Video Motion Detection 2.1 at the same time as the camera’s included application Motion Detection or another Application Package installed in the camera, because it increases load on the processor, which might affect performance.

2 References

[1] AXIS Video Motion Detection 2.1 API
[2] AXIS Video Motion Detection 2.1 User’s Guide
[3] VAPIX® HTTP API

3 Setup

3.1 Prerequisites

Before you start, check if the Axis product you are using supports AXIS Video Motion Detection 2.1. This means the following requirements must be fulfilled:

**Firmware**: 5.40 or later

**Embedded development version**: 1.10 or later

This can be done by checking these two properties with param.cgi (refer to [3]):

```
Properties.Firmware.Version
Properties.EmbeddedDevelopment.Version
```

3.2 Download Application

AXIS Video Motion Detection 2.1 can be downloaded directly from www.axis.com/applications.

3.3 Upload to Product

The application package file (*.eap) should then be uploaded to a compatible Axis product with a POST request in the following syntax:

**Syntax:**

```
http://<servername>/axis-cgi/applications/upload.cgi
```

**Example:**

```
POST //axis-cgi/applications/upload.cgi HTTP/1.1
Content-Type: multipart/form-data; boundary=--------------------------
```
3.4 Application Control

After the application is uploaded to the Axis product, you can start, stop, remove or restart it with a GET request in the following syntax:

Syntax:

http://<servername>/axis-cgi/applications/control.cgi?action=<value> [&argument=<value> ...]

Argument Description:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Valid values</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>action=&lt;string&gt;</td>
<td>remove, start, stop, restart</td>
<td>Used to remove an application package or to control an already installed application.</td>
</tr>
<tr>
<td>package=&lt;string&gt;</td>
<td>VideoMotionDetection</td>
<td>The application to operate on.</td>
</tr>
<tr>
<td>returnpage=&lt;string&gt;</td>
<td>&lt;path to return page&gt;</td>
<td>The page to return to after performing the action.</td>
</tr>
</tbody>
</table>

Example:

Start running the application:

http://<servername>/axis-cgi/applications/control.cgi?action=start&package=VideoMotionDetection
3.5 List Installed Applications

Under many circumstances, you may want to check all the installed applications on a product. This can be done by the following GET request:

http://<servername>/axis-cgi/vaconfig.cgi?action=list

3.6 Application Configuration

3.6.1 Get Configuration

The current configuration in AXIS Video Motion Detection 2.1 can be retrieved in the XML format via a GET request with the following URL:

http://<servername>/axis-cgi/vaconfig.cgi?action=get&name=VideoMotionDetection

3.6.2 Modify Configuration

The only thing you need to configure in AXIS Video Motion Detection 2.1 is your own AOI, which is defined by a polygon (refer to [2]). A list of at most 20 points can be used to define the edges of a polygon. The polygon will be drawn in the order the points are listed.

Each point is described as a pair of [X, Y] coordinates. The [1, 1] coordinate is the top right corner of the view field. The [-1, -1] coordinate is the bottom left corner. Each coordinate value is a real number. The coordinates will be converted and rounded to screen coordinates (by pixel) by the application itself.

In the configuration xml file, an AOI is defined by a “Detection Area” and an optional "Exclude Area", as in the following example:

```xml
<namedObjects>
  <namedObject name="Detection Area">
    <data knownTypeName="geometry.polygon">
      <polygon>
        <point x="0.153115311531153" y="0.264926492649265"/>
        <point x="0.962596259625963" y="-0.464946494649465"/>
        <point x="0.646964696469647" y="-0.62996299629963"/>
        <point x="-0.128112811281128" y="0.17991799179918"/>
      </polygon>
    </data>
  </namedObject>
  <namedObject name="Exclude Area">
    <data knownTypeName="geometry.polygon">
      <polygon>
        <point x="-0.168716871687169" y="0.249024902490249E-02"/>
        <point x="0.843784378437844" y="0.14991499149915"/>
        <point x="0.843784378437844" y="-0.24992499249925"/>
        <point x="-0.021902190219022" y="-0.434943494349435"/>
      </polygon>
    </data>
  </namedObject>
</namedObjects>
```
The only thing needs to be done in order to configure your own AOI is to modify the coordinates in the above section in the configuration file and then send the file to Axis product via a Post request with the following syntax (Please note that for all POST method, the parameters must be included in the body of the HTTP request):

```
http://<servername>/axis-cgi/vaconfig.cgi?action=modify&name=VideoMotionDetection
```

**Example:**

```
POST http://<servername>/axis-cgi/vaconfig.cgi HTTP/1.0
Content-Type: application/x-www-form-urlencoded
Content-Length: <content length>
action=modify&name=VideoMotionDetection
<config version="1.0"> ...
</config>
```

## 4 Event Handling

Whenever AXIS Video Motion Detection 2.1 detects a motion, it will be sent as an event notification in the event stream from the Axis product.

### 4.1 Get Event Declaration

In order to configure actions when a motion event is triggered, it’s important to get the motion event declaration first. Event declaration can also be used to construct an event filter expressions for notification subscriptions.

#### 4.1.1 GetEventInstances

The VAPIX® Event Service provides a method GetEventInstances to fetch all the currently available events’ declarations from an Axis product.

The entry point of the event service is: [http://SERVER/vapix/services](http://SERVER/vapix/services)

The event service WSDL file is located at: [http://SERVER/wsdl/vapix/EventService.wsdl](http://SERVER/wsdl/vapix/EventService.wsdl)

#### 4.1.2 Event Declaration Syntax

The event declarations retrieved via GetEventInstances are listed as a wstop:TopicSet tree containing MessageInstance elements in each leaf topic, which describes the contents of the event that can be emitted for the given topic.

The topic tree has the following syntax:
**4.1.3 AXIS Video Motion Detection 2.1 Event Declaration**

The declaration of motion event sent by AXIS Video Motion Detection 2.1 looks like this:

```xml
<tnsaxis:VideoMotionDetection aev:NiceName="VideoMotionDetection" xmlns:tnsaxis="http://www.axis.com/2009/event/topics">
  <motion wstop:topic="true" xmlns:wstop="http://docs.oasis-open.org/wsn/t-1">
    <aev:MessageInstance aev:isProperty="true">
      <aev:SourceInstance>
        <aev:SimpleItemInstance aev:NiceName="Area ID" Type="xsd:string" Name="areaid">
          <aev:Value>0</aev:Value>
        </aev:SimpleItemInstance>
      </aev:SourceInstance>
    </aev:MessageInstance>
  </motion>
</tnsaxis:VideoMotionDetection>
```

*MessageInstance* has an optional *isProperty* attribute, which is used to mark property events. Default value for *isProperty* is 'false'.

*SourceInstance* and *DataInstance* element list the *SimpleItems* for respective section on the event. *SimpleItems* are described with *SimpleItemInstance* elements.

*SimpleItemInstance* element contains attributes and a list of *Value* sub-elements. *Name* attribute is simple item's name. *Type* describes the data-type for the *SimpleItem's* values. An optional *NiceName* attribute is the Key's nice name.

A *Value* element list one of the possible *SimpleItem's* values with an optional nice name given with *NiceName* attribute.
The event named *motion* is sent every time a motion is detected or not detected any more.

*areaid* defines the id of an AOI. Currently 0 is the only valid value as only one AOI is supported by AXIS Video Motion Detection 2.1. However, more AOIs may be supported in the future versions. Therefore, *areaid* can be used as event filter to e.g. trigger an alarm only when events are detected in a specific AOI.

*areapolygon* defines an AOI polygon. It should be treated as metadata and should not be used to as event filter.

The value of *active* defines if a motion is active or not. A motion is active until an event with *active=0* is sent. It should be used as event filter.

### 4.2 Subscribe to Event Notification

To retrieve the motion event notification sent from AXIS Video Motion Detection 2.1, you need to subscribe to the RTSP stream using the following URL (Set *video=1* if you want to retrieve video stream at the same time as event stream):

```
rtsp://<servername>/axis-media/media.amp?video=0&event=on&eventtopic=onvif:RuleEngine/axis:VideoMotionDetection/motion
```

The response is provided in XML format according to [4]. Everything specific to AXIS Video Motion Detection 2.1 is marked in **bold**:
Here **UtcTime** refers to the absolute time this event took place. Axis products use RTP timestamp when sending video stream, which is relative time. The conversion from absolute time to RTP timestamp can be found in the RTCP packets which are used to synchronize event and video stream.