

The same image and yet different – Using the sequence AOI

Imagine you want to capture the same object with different acquisition parameters. That would mean that you set the camera parameters, capture the object, change the camera parameters, capture the object again, change the camera parameters, and capture the object again and so on. You think that's pretty time-consuming? That's right!

For camera models UI-124x/UI-324x/UI-524x and UI-125x/UI-325x/UI-525x with e2v sensors, there is a special feature available: the sequence AOI mode. The sequence AOI mode allows you to capture, for example, the same scene using different parameter sets (exposure, gain, etc.).

Background

The sequence AOI mode captures the different areas of interest (AOI) one after another. The sensor readouts all AOIs sequentially and transfers the images as for example the same AOI is readout four times. The frame rates are identical, but you can define different settings. For every AOI exposure time and master gain can be set individually. For example, you can capture the same AOI at first with a short exposure time and after this with a long exposure time.

With this function you can define in addition to the normal AOI (hereafter referred to as AOI 1) up to three AOIs (AOI 2-4). These additional AOI have the same size as AOI 1, but you can set different parameters for:

1. Position of AOI
2. Exposure time
3. Gain
4. Readout cycles (number of images)

uEye Cockpit

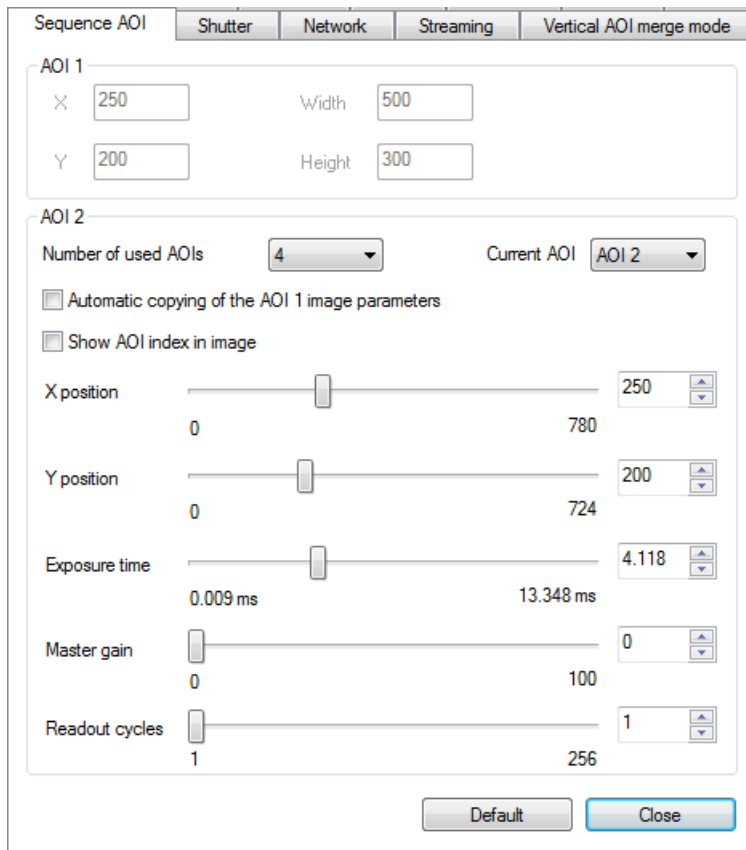
Open the camera in uEye Cockpit and define the desired image area via an AOI. Now open the camera properties via "uEye > Properties" and switch to the "Sequence AOI" tab.

When activating the sequence mode, note that only the following combinations are possible:

1. All additional AOIs are off. AOI 1 is always active.
2. AOI 2 (+ AOI 1)
3. AOI 2 and 3 (+ AOI 1)
4. AOI 2, 3 and 4 (+ AOI 1)

It is not possible to have a combination e.g. of AOI 2 and AOI 4.

Activating the sequence AOI mode

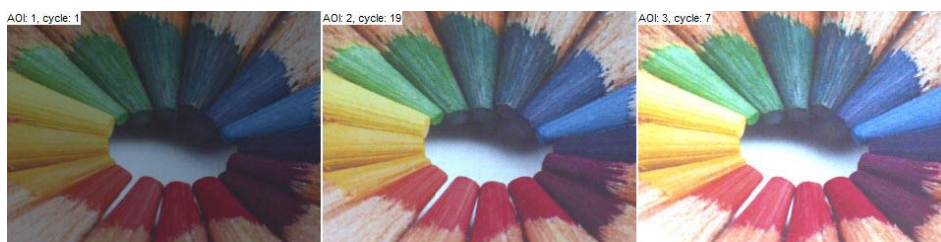


In the upper area you see the position and size of AOI 1 that you have already defined. (If you want to change it later, you can change the settings in the “Size” tab.) In the area below you define the further AOIs (AOI 2 to AOI 4):

- **Number of used AOIs**
Here, you define the numbers of additional AOI.
- **Current AOI**
Here, you select the AOI which parameters you want to edit. You can only change the parameters of AOI 2, 3 or 4. If you want to change the settings of AOI 1, you change the exposure time in the “Camera” tab, the gain in the “Image” tab and the AOI size and position in the “Size” tab.
- **Automatic copying of the AOI 1 image parameters**
If this option is activated, changes on the settings of AOI 1 are copied to the current selected AOI.
- **Show AOI index in image**
Activate this option to see in the left upper corner of the image the number of the AOI.
- **X position/Y position**
Moves the current selected AOI in vertical or horizontal direction respectively. An overlapping of the different AOIs is possible.
- **Exposure time**
Changes the exposure time of the current selected AOI.
- **Master gain**
Sets the gain for the current selected AOI.

TechTip: Using the sequence AOI

- Readout cycles
Here, you can define for AOI 2-4 how often they are readout and the images are transferred. AOI 1 is always readout once.



Pictures with different gain settings

Note that the sequence AOI mode cannot be used in combination with scaler, image mirroring, subsampling, or binning.

Application areas

By capturing the same AOI with different exposures, you can use the sequence AOI mode to realize bracketing or to calculate an HDR image by software.

You can capture different AOIs with different acquisition parameters sequentially. Here, you can set different position, exposure time, gain or readout cycles. An important advantage of the sequence AOI mode is that the position shift will cost no time and no reprogramming of the AOI is necessary.

Summary

The sequence AOI mode is useful for a variety of applications. For example, you can use it in applications with unknown light or brightness conditions.

With the uEye API functions “is_AOI” or the uEye .NET class “Sequence” you can set and query the settings of the sequence AOI mode.

For further information on setting the sequence AOI mode, refer to the uEye manual at <http://de.ids-imaging.com/manuals-ueye.html>.

The table below shows which camera models from which driver version on support the sequence AOI mode.

Interface	Camera model	IDS Software Suite
USB 3.0	UI-3240CP	4.00 or higher NIR: 4.01 or higher
	UI-3240LE	4.40 or higher
	UI-3241LE	4.40 or higher
	UI-3242LE	4.40 or higher
	UI-3240ML	4.40 or higher
	UI-3250CP	4.21 or higher
	UI-3250LE	4.40 or higher

Interface	Camera model	IDS Software Suite
	UI-3251LE	4.40 or higher
	UI-3252LE	4.40 or higher
	UI-3250ML	4.40 or higher
USB 2.0	UI-1240LE	3.90 or higher NIR: 4.01 or higher
	UI-1241LE	3.90 or higher NIR: 4.01 or higher
	UI-1242LE	3.90 or higher NIR: 4.01 or higher
	UI-1240ML	4.03 or higher
	UI-1240SE	3.90 or higher NIR: 4.01 or higher
	UI-1250LE	4.21 or higher
	UI-1251LE	4.21 or higher
	UI-1252LE	4.21 or higher
	UI-1250ML	4.21 or higher
	UI-1250SE	4.21 or higher
	GigE	UI-5240CP
UI-5241LE		4.01 or higher
UI-5242LE		4.01 or higher
UI-5244LE		4.01 or higher
UI-5240RE PoE		4.21 or higher
UI-5240SE		3.90 or higher NIR: 4.01 or higher
UI-5250CP		4.21 or higher
UI-5251LE		4.21 or higher
UI-5252LE		4.21 or higher
UI-5254LE		4.21 or higher
UI-5250RE PoE		4.21 or higher
UI-5250SE		4.21 or higher

Authors

Marion Gentele, Technical Documentation
Alexander Lewinsky, Product management

Contact

IDS Imaging Development Systems GmbH
Dimbacher Straße 6-8
74182 Obersulm
Germany

Phone: +49 7134 96196-0

Email: marketing@ids-imaging.com

Web: www.ids-imaging.com

© 2016 IDS Imaging Development Systems GmbH

More TechTips and case studies [can be found on our website.](#)