



Model Linear-1024

USER MANUAL

Contents

Overview	3
Software installation	
Basics	4
Advanced	5
Getting started	6
Software operation	
Basics	7
Region of interest	9
Options	10
Normalization	12
Background compensation	13
Saving image	14
Recording video	15
Drawings	16
Troubleshooting	17

Notation



left-click



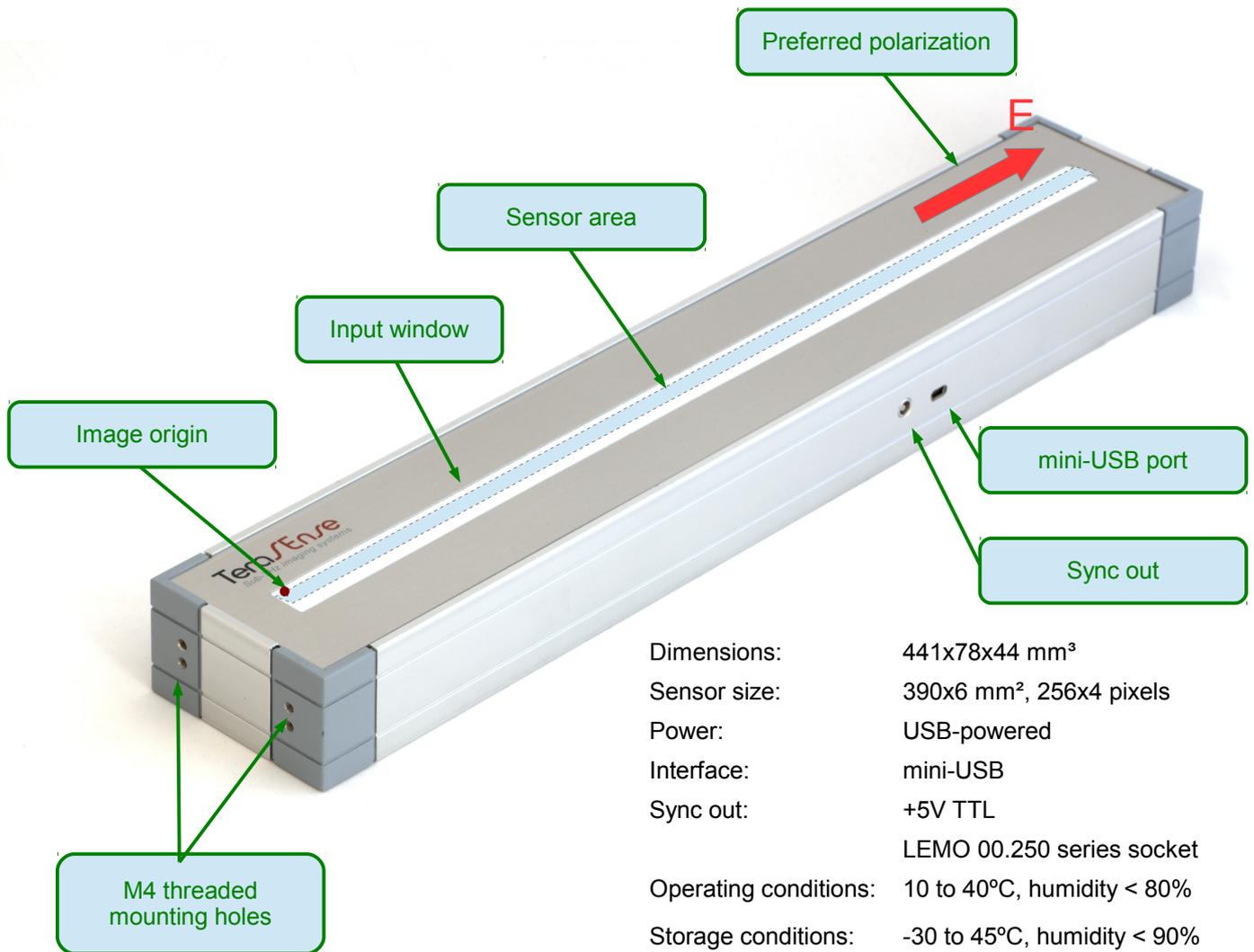
click-and-drag



right-click

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Overview



Dimensions: 441x78x44 mm³
 Sensor size: 390x6 mm², 256x4 pixels
 Power: USB-powered
 Interface: mini-USB
 Sync out: +5V TTL
 LEMO 00.250 series socket
 Operating conditions: 10 to 40°C, humidity < 80%
 Storage conditions: -30 to 45°C, humidity < 90%

exposure	0	1	2	3	4	5	6	7	8	9	10
framerate, fps	100	71	45	25	14	8,2	3.7	1.8	0.9	0.45	0.23
relative amplification	1	2.4	5.2	11	22	44	88	177	355	709	1420

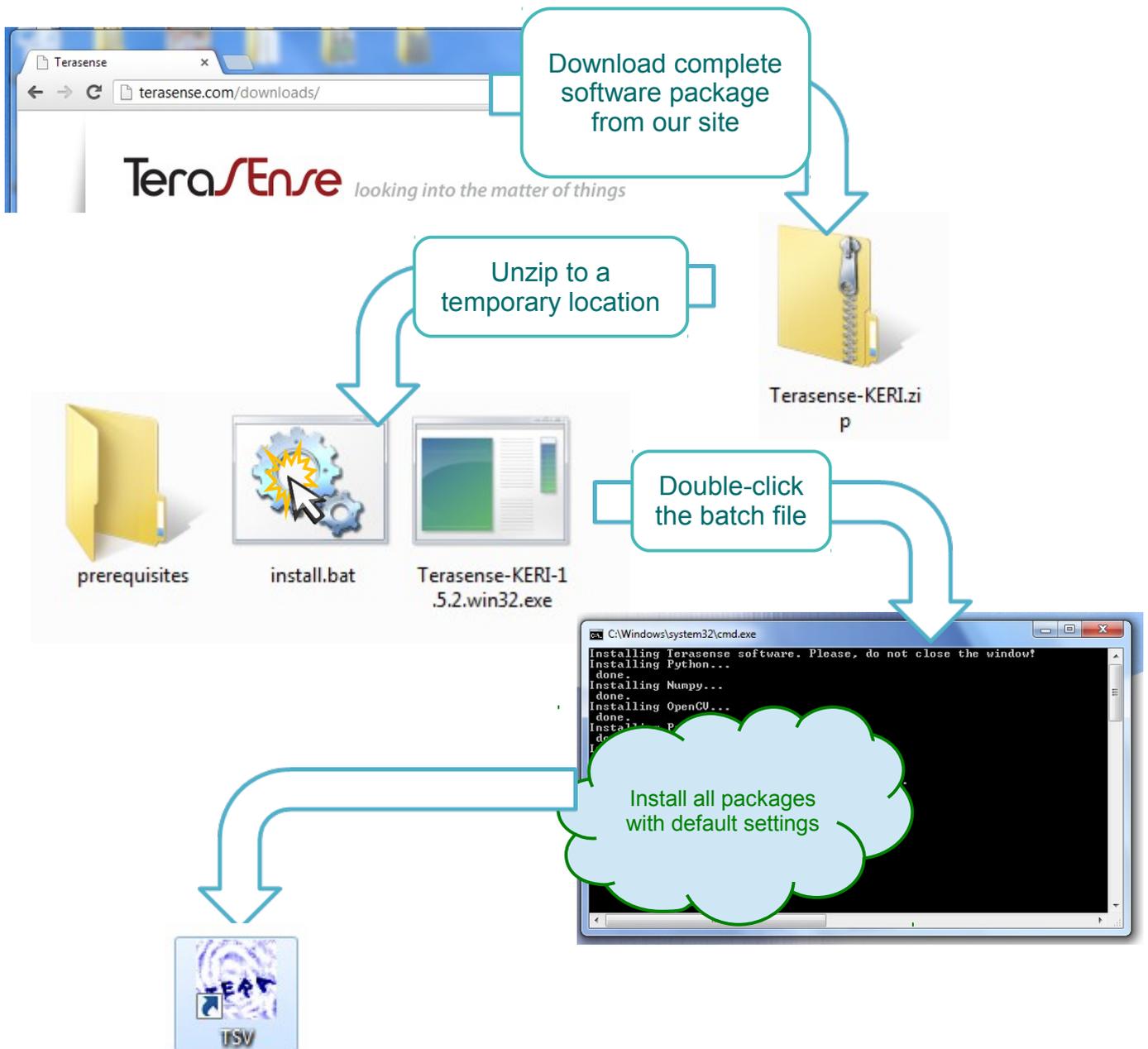
TeraSense camera is sensitive to polarization. Preferred direction of electric field is along the long axis as indicated in the figure.

Software Installation

Basic



If you are already using Python software, please, see next page



Congratulations, you are done!

TSV (TeraSense Vierer) icon is created on your desktop and Terasense folder is created in your Start Menu.

Software Installation

Advanced

TeraSense software depends on the following Python packages:



If you have all of them installed, you only need to download and install Terasense package proper:



Terasense-KERI-1
.5.2.win32.exe

When software installation finishes, connect your device to PC using USB-miniUSB cable and wait for Windows installing driver for the device controller (Opal Kelly XEM6001).

You can obtain missing packages from the respective repositories, or from complete software package on our website (in the “prerequisites” folder):



Terasense-KERI.zip

TeraSense software may or may not work with earlier versions of the prerequisite packages. Consult our support for more information.

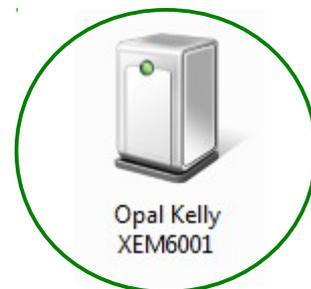
TeraSense software won't work with Python 3.x ! It is not supported by some prerequisite packages, notably, Numpy. It is possible to install Python 2.7 and Python 3.x side by side, though.

Getting started



Connect device to PC using USB cable

Run TeraSense software



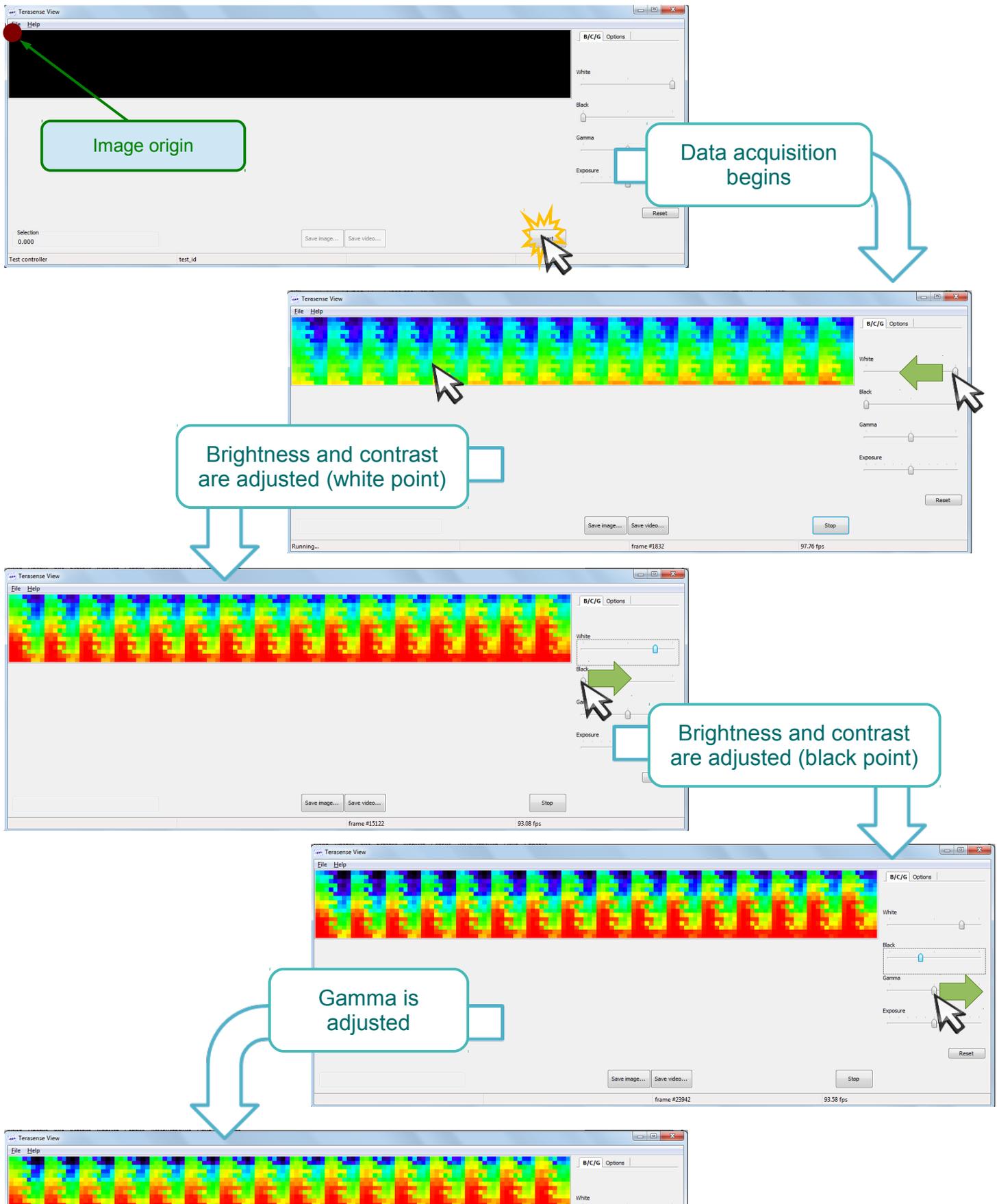
TeraSense camera appears in the "Devices and Printers" window as "Opal Kelly XEM6001"

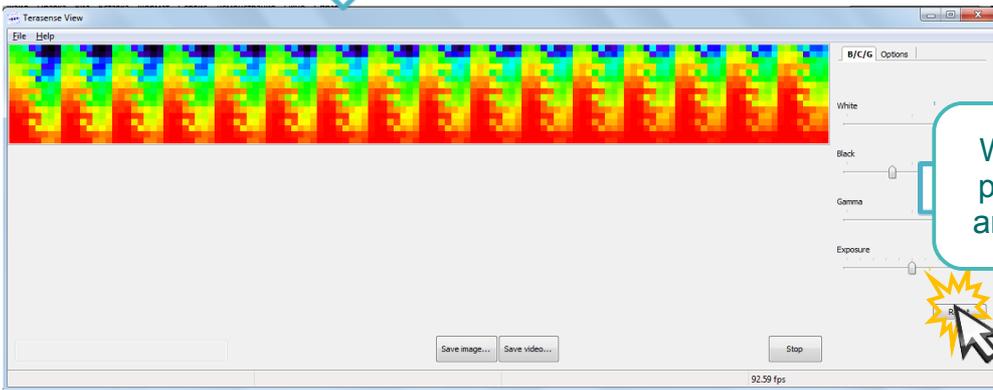
When connecting for the first time to a new PC you'll need to wait while Windows installing drivers for the device.

TeraSense camera is sensitive to changes in temperature. If you bring camera from a cold or hot place, please, wait until its temperature comes into balance and you'll likely need to take new recording of background data (see p.13).

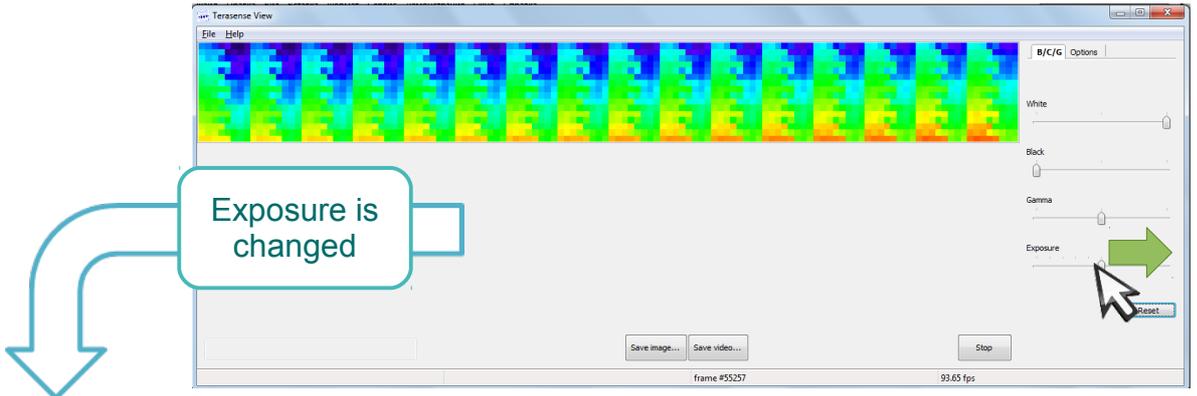
Software operation

Basics

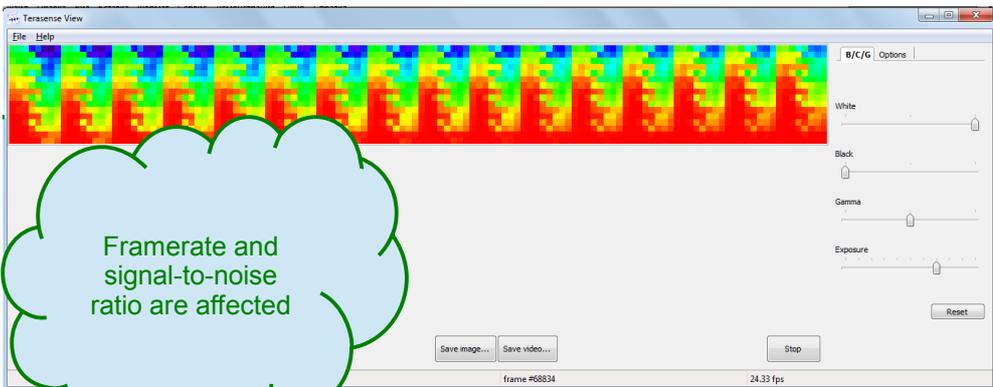




White point, black point, and gamma are reset to default



Exposure is changed

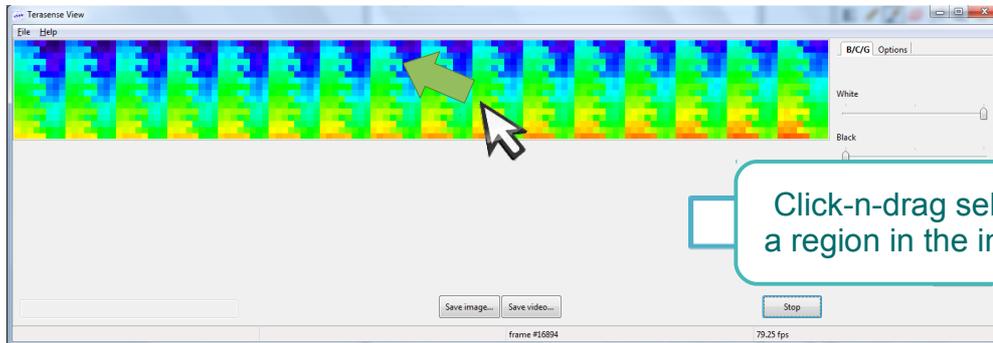


Framerate and signal-to-noise ratio are affected

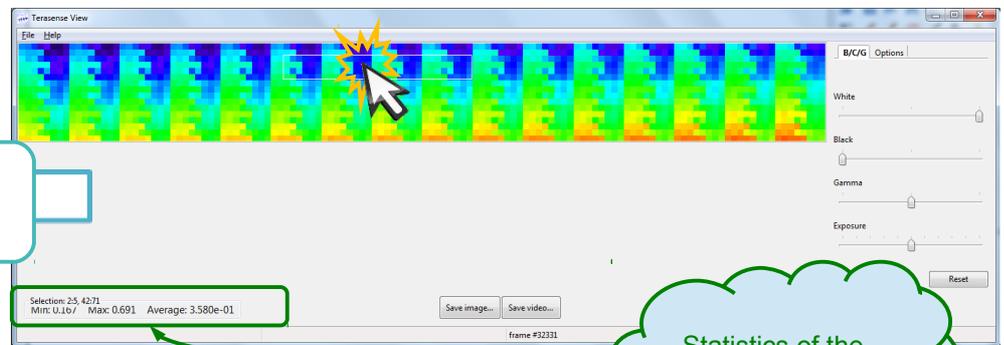
- One step corresponds to 2x change in exposure.
- Maximum framerate (at shortest exposure) is about 45 fps

Software operation

Region of interest



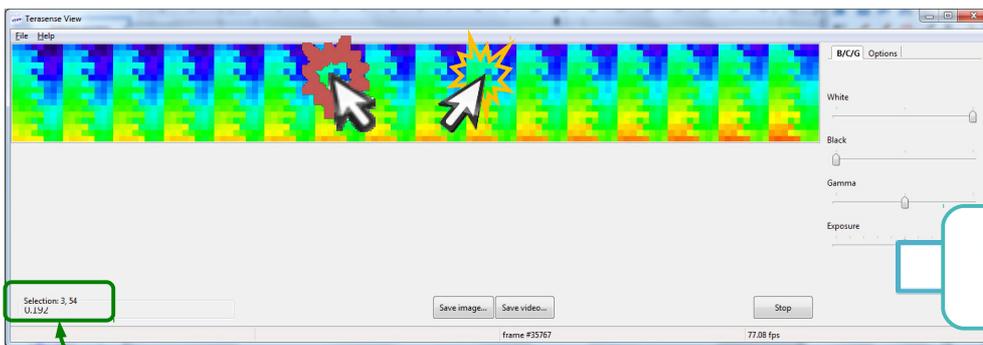
Click-n-drag selects a region in the image



Left-click selects single point

Statistics of the selected region

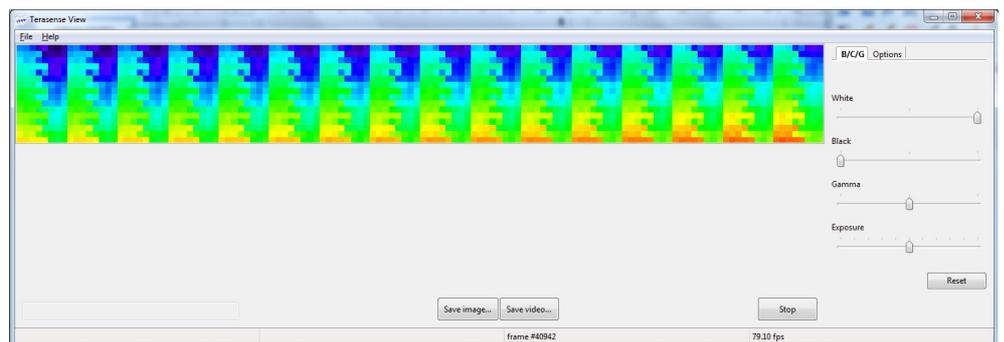
Selection: 25, 4271
Min: 0.167 / Max: 0.691 / Average: 3.580e-01



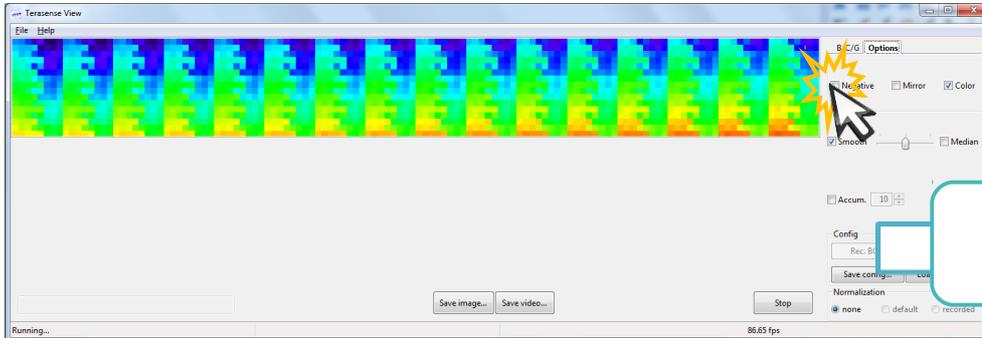
Right-click removes selection

Coordinates and value at the point

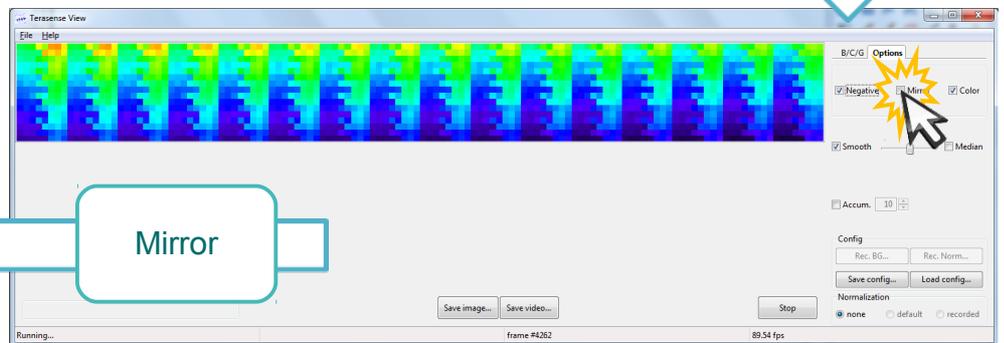
Selection: 3, 54
0.1372



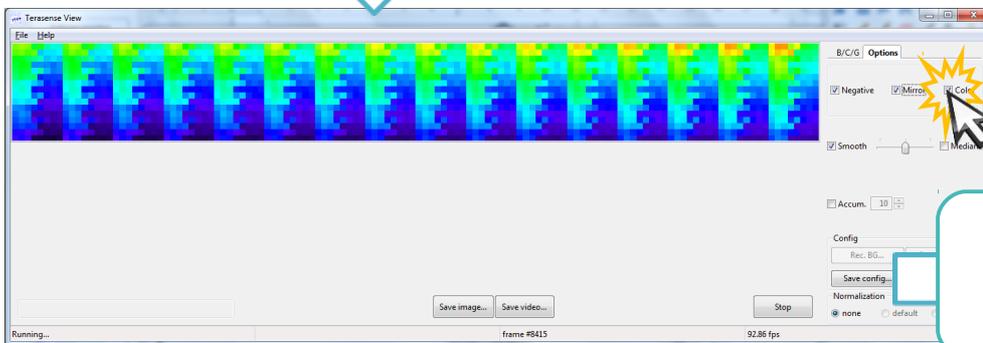
Software operation Options



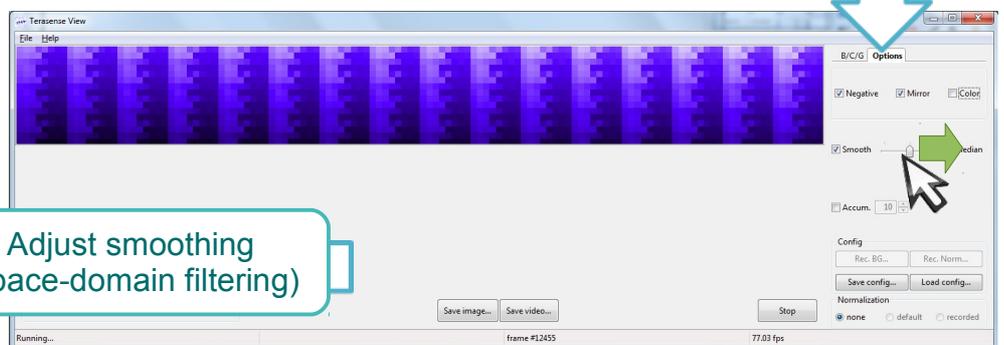
Negative



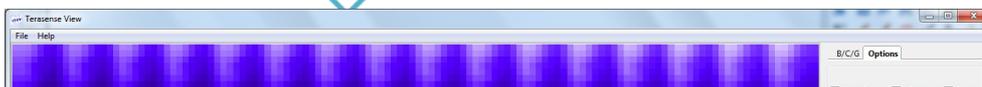
Mirror

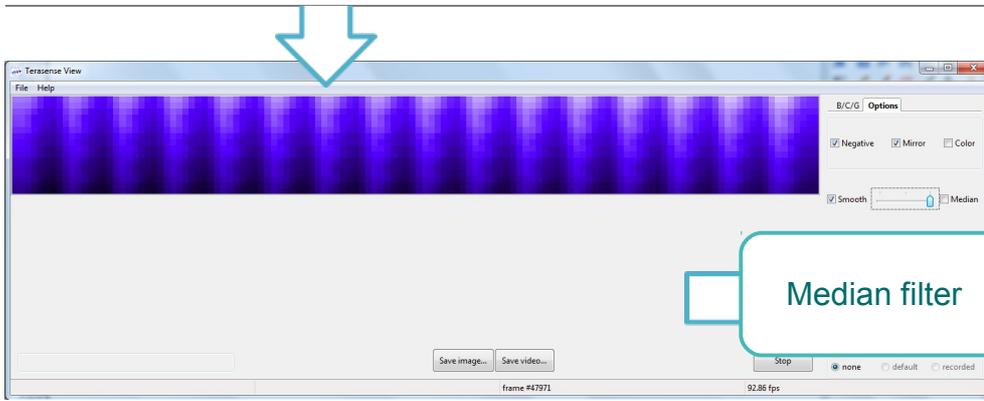


Switch between
pseudo-color and
bw image



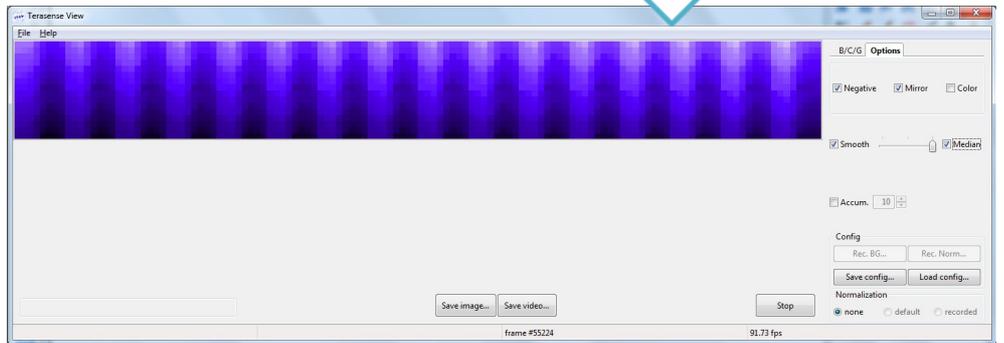
Adjust smoothing
(space-domain filtering)



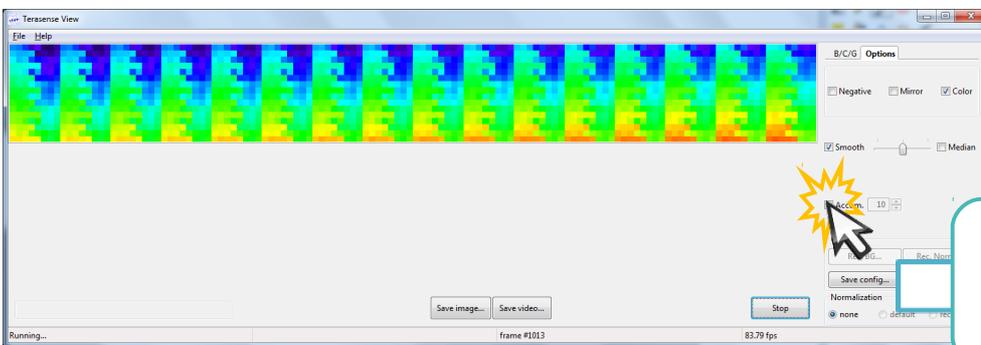


Median filter

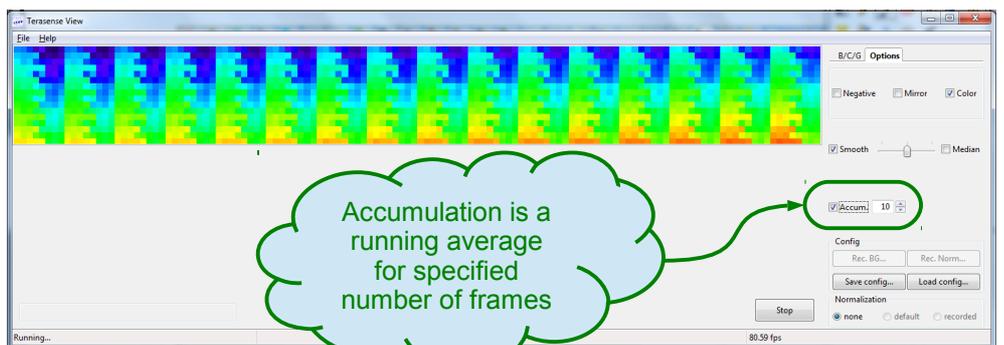
Default filter is averaging with 3x3 kernel



Median filter uses either 3x3 or 5x5 kernel



Accumulation (time-domain filtering)

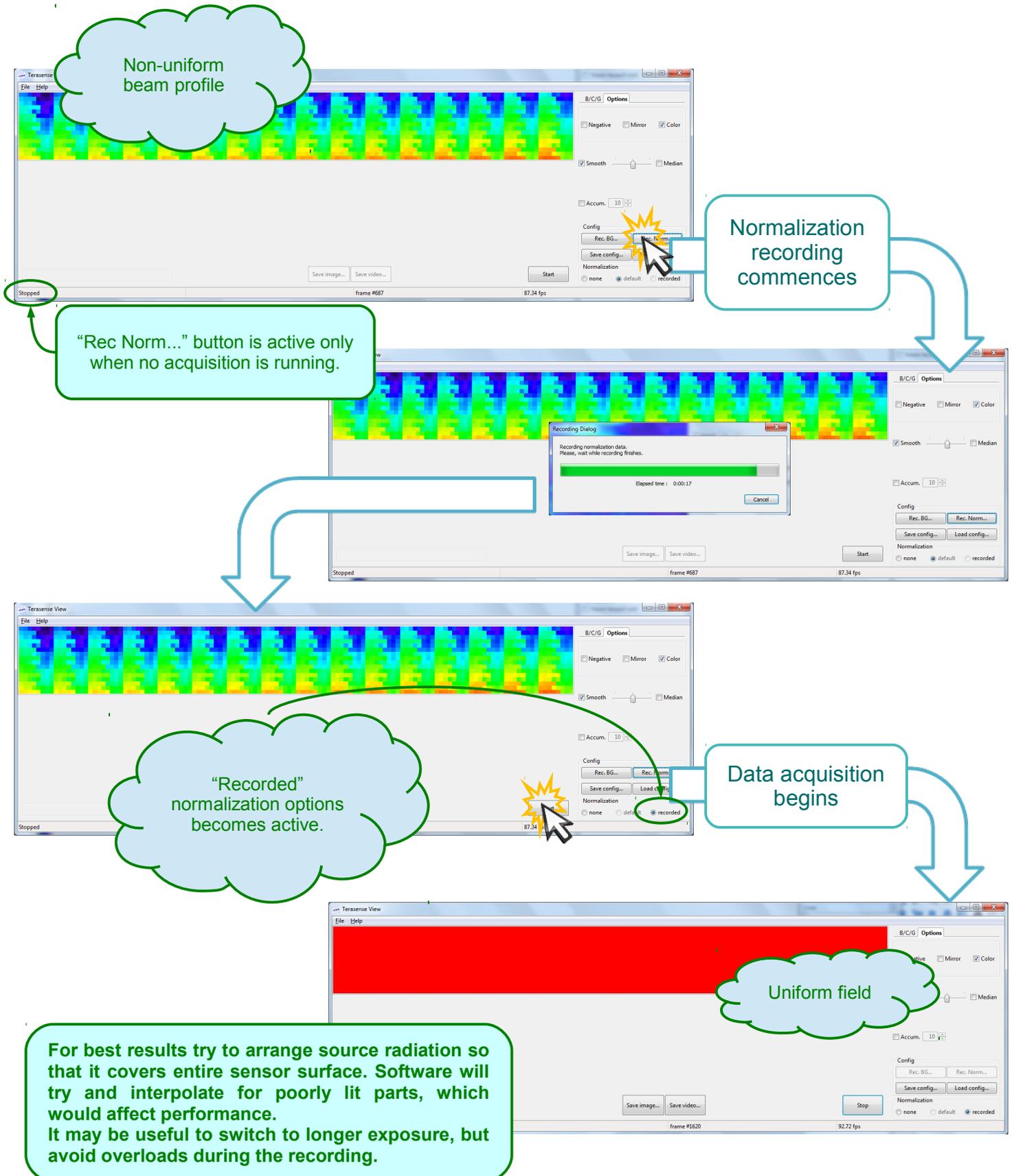


Accumulation is a running average for specified number of frames

Software operation

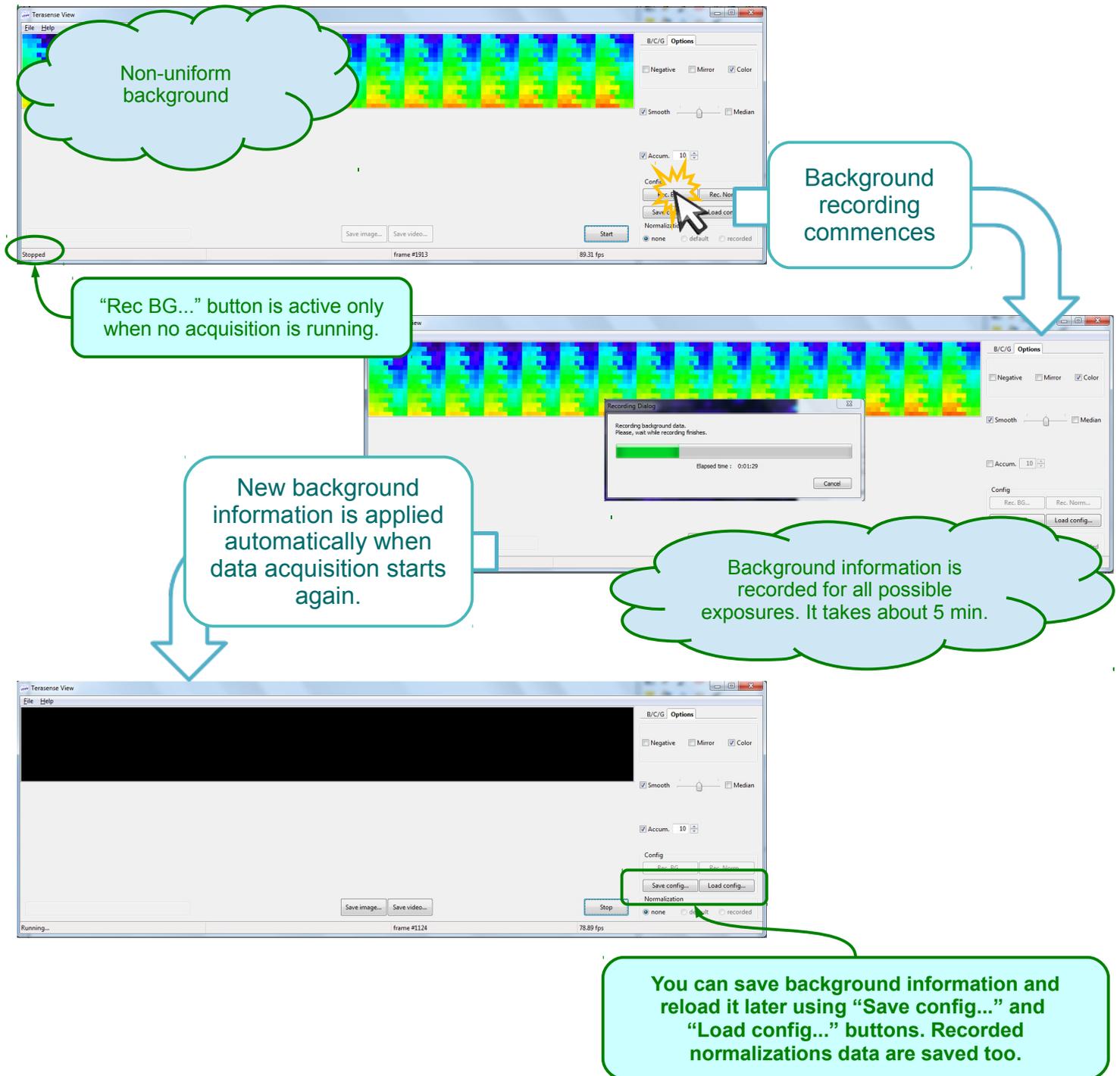
Normalization

(compensation for beam profile)



Software operation

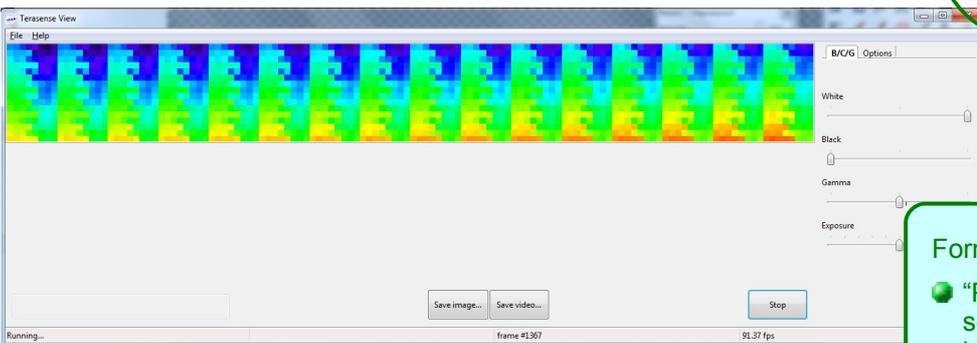
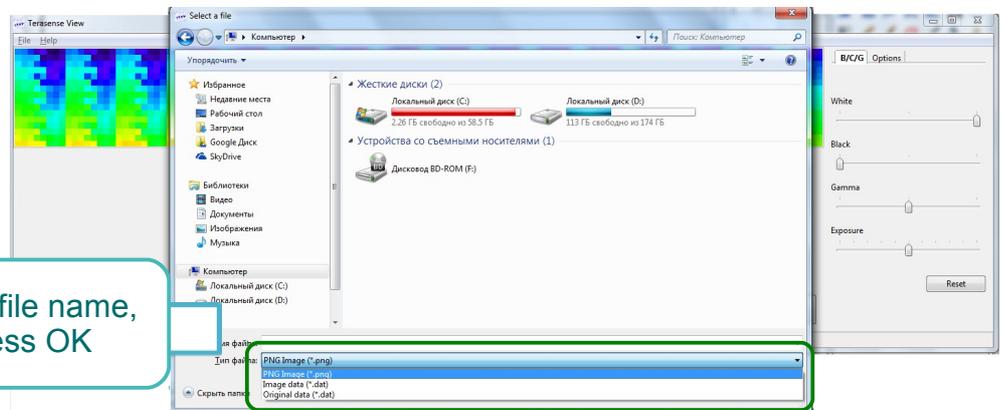
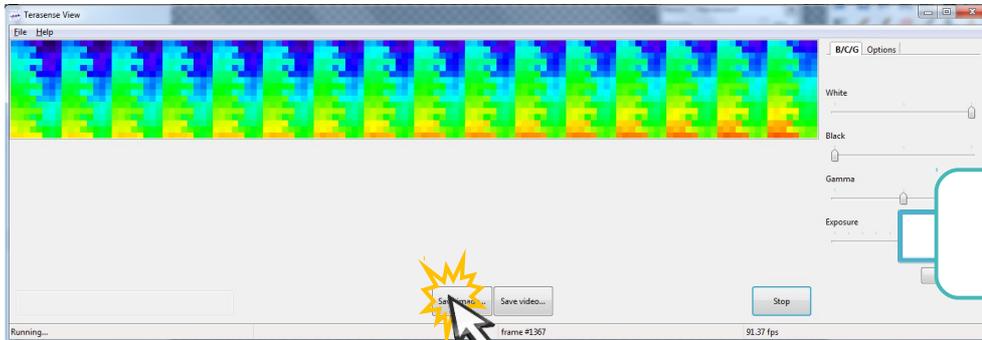
Background compensation



Do not forget to switch off radiation source before recording background information if!

Software operation

Saving Image

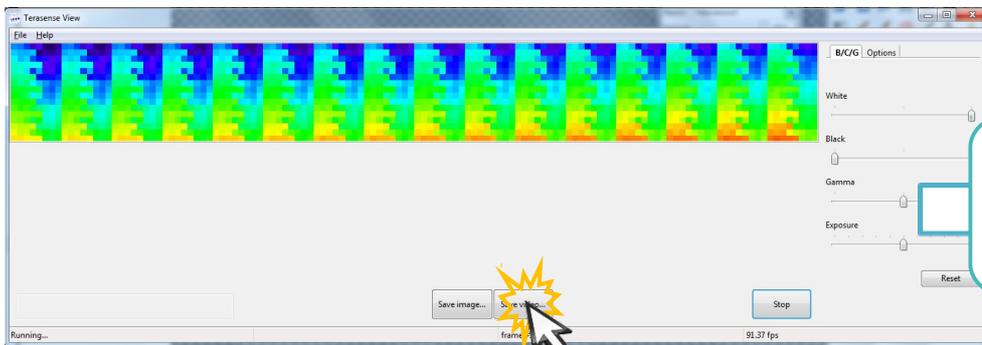


Format options:

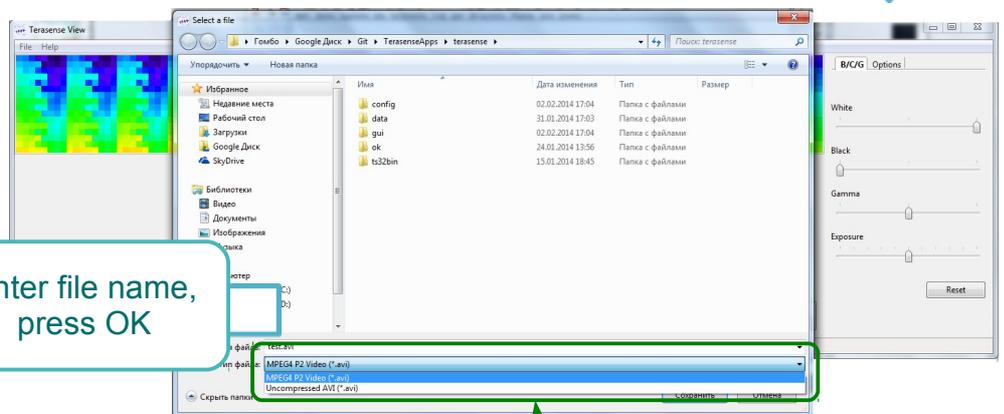
- "PNG Image": a copy of what you see on the screen in a common image format;
- "Image data": comma-separated values for the image pixels as floats in 0 to 1 range
- "Original data": the same format as "Image data" but without any brightness/contrast/gamma corrections applied

Software operation

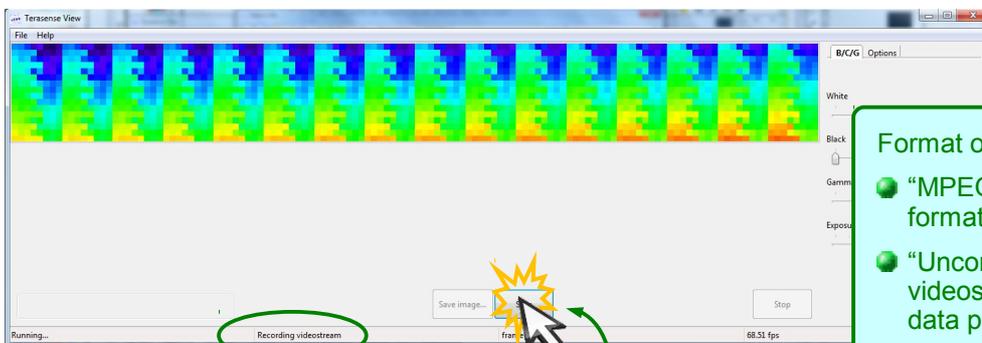
Recording video



File selection dialog is opened



Enter file name, press OK



Format options:

- "MPEG4 P2 Video": a common video format playable by most videoplayers;
- "Uncompressed AVI": uncompressed videostream, useful if you want to do data processing.

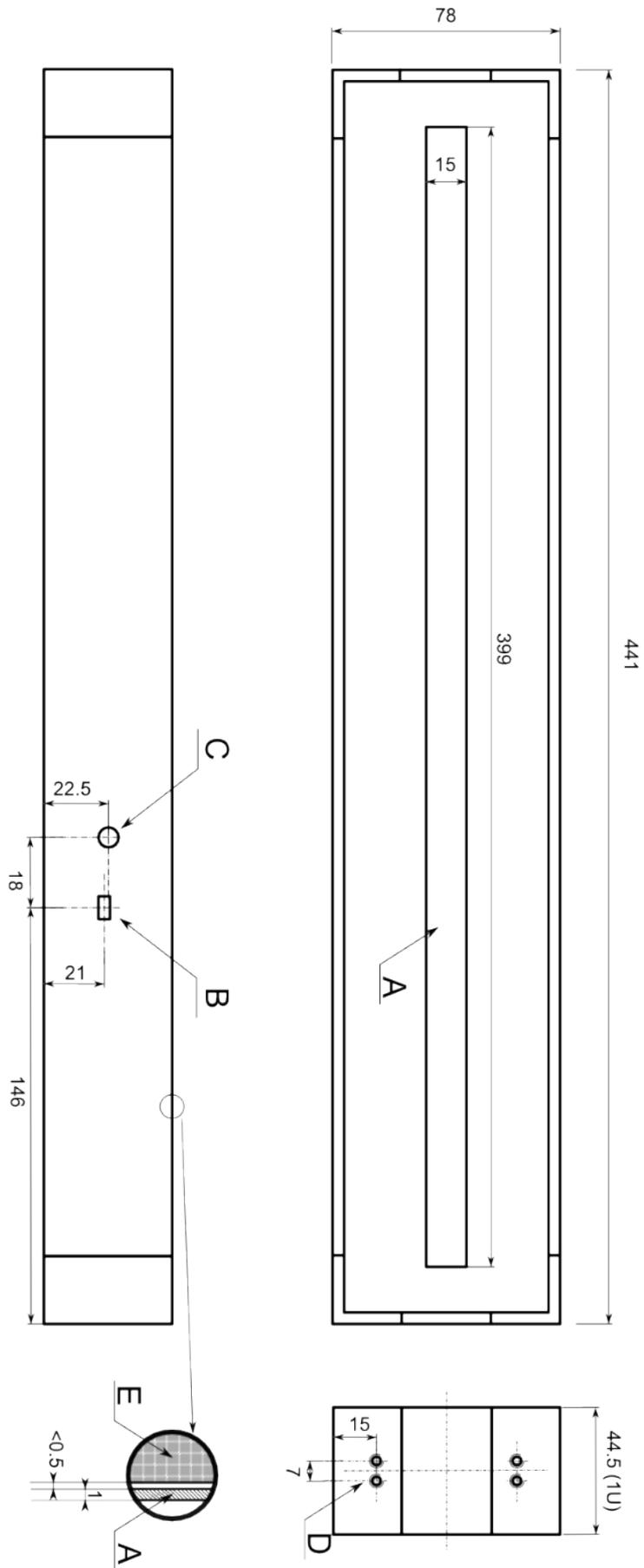
Recording in progress indicator

Click to end recording.

Generally, video is recorded at actual frame rate, but if it is less than 1 fps, frame rate of the video would be 1 fps.

Drawings

TERA-1024 model Linear

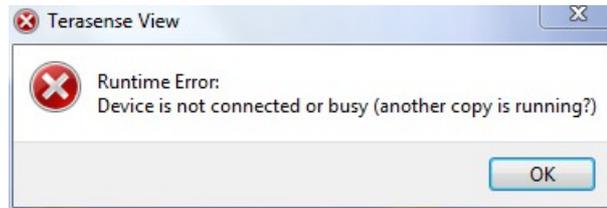


- A - PTFE window
- B - data connector (miniUSB socket)
- C - sync out (LEMO 00 socket)
- D - mounting holes (M4, 4 holes on both sides)
- E - sensor's surface

TeraSense 2015

Troubleshooting

Problem:



Solution:



Is Opal Kelly XEM6001 present in "Devices and Printers" window?

Yes

No

Use "Alt-Tab" to look for another copy of the Terasense View software (only one copy can be running at a time)

Use "Ctrl-Shift-Esc" to start Windows Task Manager and kill all pythonw.exe processes, then restart Terasense View software.

Check that the camera is connected.

If you are using USB hub (especially, unpowered USB hub), try to connect the camera directly to your PC.

Try to connect the camera to another USB port on your PC.

Disconnect any other USB devices and reconnect the camera.

If the software have crashed (for example, due to the device being disconnected during the run) it may have left a zombie process, which would prevent new copy from running .

TeraSense camera is USB-powered device. Use of non-standard and non-compliant USB accessories may cause deficit of power at the USB port, which would prevent camera form working properly.