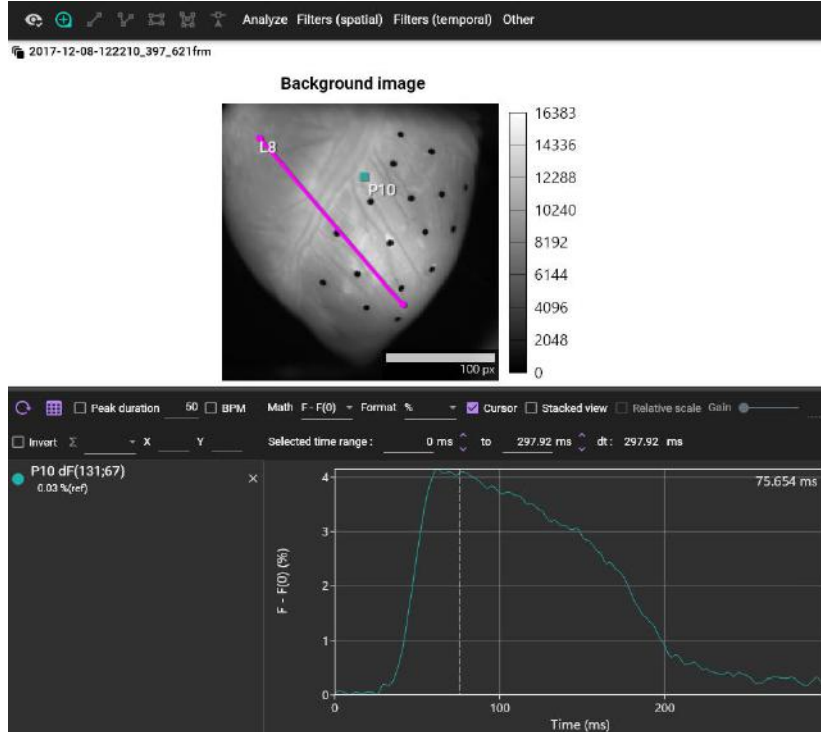## 8-1-2. Line (straight light)

(1) Line drawing
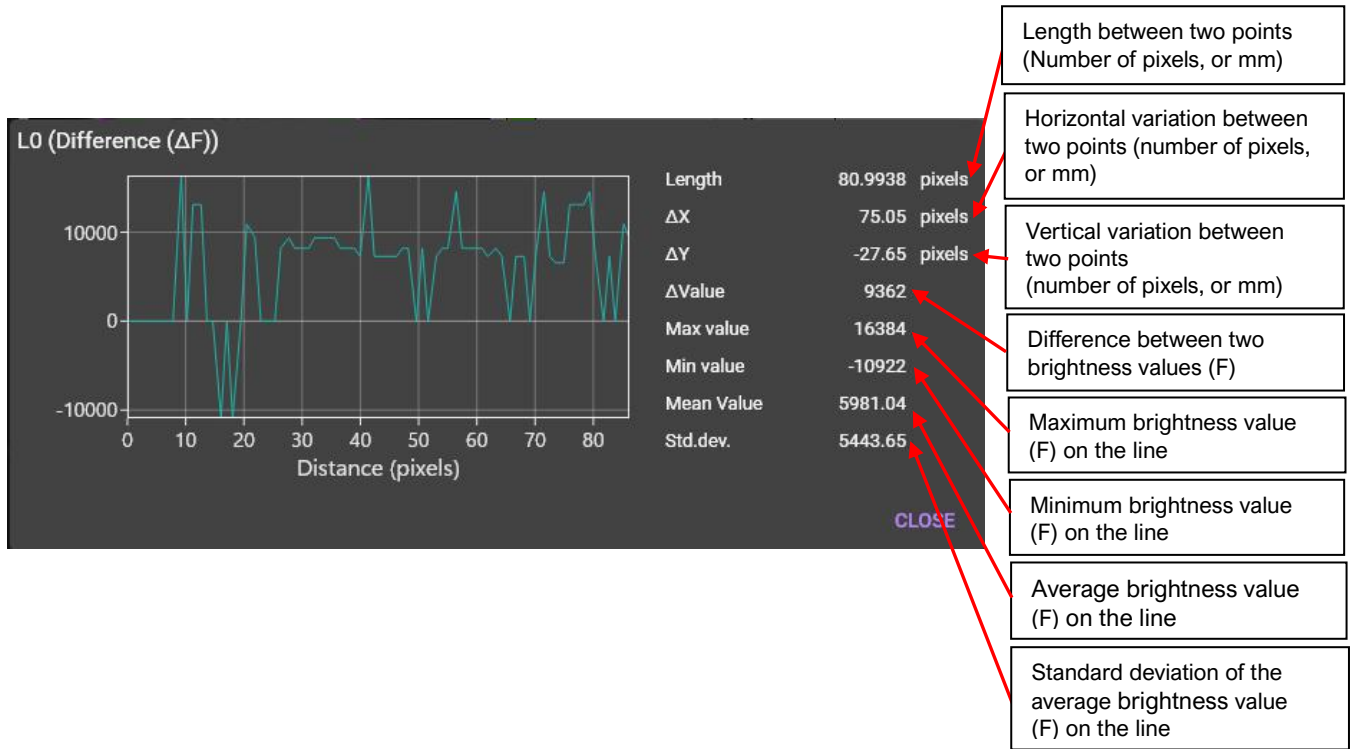
With "Add line" [icon] selected, click two points on image and specify straight line.

Operation	Description	
With [icon] selected Click on image	Click two points to specify straight line	
Click a specified line	Select line	
Mouse drag point	Change line position and length	
Right click on point	Line info	Line information display (see page 49 (2))
	Set scale	Specify line length in mm
	Conduction velocity	Measure conduction velocity on line (see page 50 (3))
	Spatiotemporal plot	Display the spatiotemporal map (see page 52 (4))
	Copy	Copy line coordinates and display in another data of same data set
	Rename	Change line name
	Delete	Delete line

(2) Line information display (Line info)

Right click on line and select "Line info". Information about specified line is displayed.

L0 (Difference (ΔF))		
Length	80.9938	pixels
ΔX	75.05	pixels
ΔY	-27.65	pixels
ΔValue	9362	
Max value	16384	
Min value	-10922	
Mean Value	5981.04	
Std.dev.	5443.65	

Length between two points (Number of pixels, or mm)

Horizontal variation between two points (number of pixels, or mm)

Vertical variation between two points (number of pixels, or mm)

Difference between two brightness values (F)

Maximum brightness value (F) on the line

Minimum brightness value (F) on the line
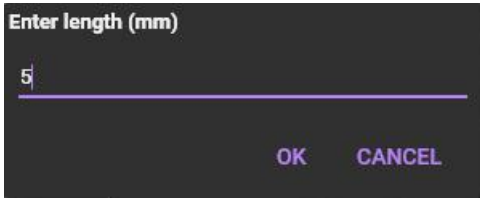
Average brightness value (F) on the line

Standard deviation of the average brightness value (F) on the line
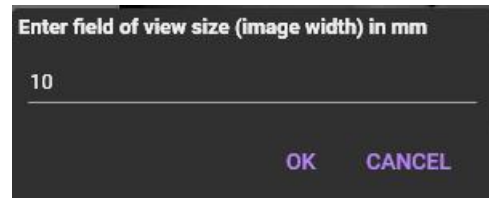
(3) Conduction velocity

Right click on line and select [Conduction velocity]. Conduction velocity of signal between start point and end point can be measured.

(a) The scale must be set in advance. There are two ways.
    (1) Right-click on line and click [Set scale]. Enter length of straight line in mm.
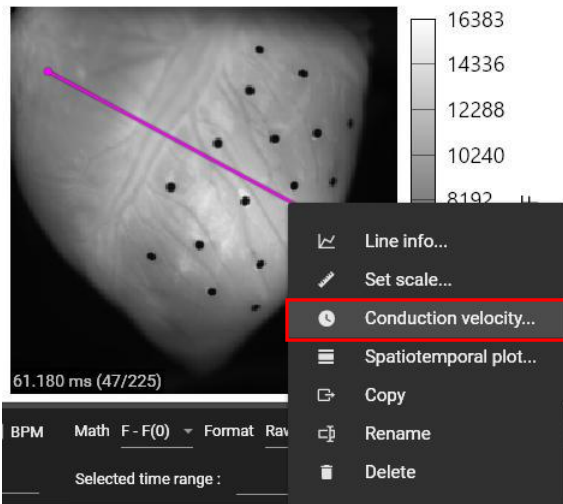   (2) Right-click on image and click [Image scale]-[Set scale]. Enter horizontal length of image in mm

Enter length (mm)

5

OK   CANCEL

(1) Enter length of straight line in mm.

Enter field of view size (image width) in mm

10

OK   CANCEL

(2) Enter image width in mm.

(b) Right-click on line and click [Conduction velocity].

Image (F)

16383
14336
12288
10240
8192

61.180 ms (47/225)

BPM   Math F - F(0) Format Rav

Selected time range :

- Line info...
- Set scale...
- Conduction velocity...
- Spatiotemporal plot...
- Copy
- Rename
- Delete

(c) The [Peak selection] screen is displayed. Peaks are automatically detected and each peak is numbered. Check the displayed settings and click the [OK] button.

Peak selection

Preview point

Options

From   0 ms
To   9864.61 ms
First peak   575.89 ms
Peak interval   1001.49 ms   Auto
Peak count   9

Peak positions (approximate)

OK   CANCEL
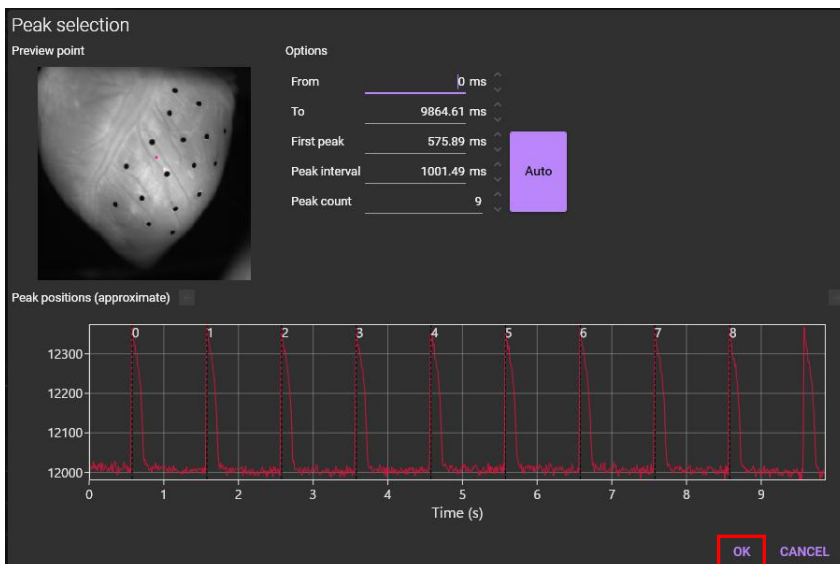
(d) The conduction velocities of multiple peaks (action potentials) are calculated and displayed.

Coordinates of start point

Coordinates of end point

Conduction velocity from P1(207,155) to P2(19,27)

Distance :	88.8429 mm		Distance between two points
Average velocity :	1.42397 m/s		Average speed of multiple peaks

	Time 1 (ms)	Time 2 (ms)	Time difference (ms)	Conduction velocity (m/s)
AP0	940.183	1002.38	62.1933	1.4285
AP1	2941.57	3004.57	62.998	1.41025
AP2	4941.71	5003.66	61.9546	1.434
AP3	6942.63	7005.94	63.308	1.40334
AP4	8942.92	9005.1	62.1775	1.42886
AP5	10941.1	11003.3	62.2155	1.42799
AP6	12942.8	13003.9	61.0565	1.45509
AP7	14941.9	15004.2	62.3286	1.4254
AP8	16942.6	17006	63.3566	1.40227

SAVE...   CLOSE

Peak number assigned on the Peak selection screen

Peak time of start point

Peak time of end point

Time difference between peak of start point and peak of the end point

Conduction velocity

Output values to CSV file

Close screen

Example of CSV file

Date created	2020/07/07 15:39:57			
Source data nar	2017-12-08-122210 (bdm more light no noise s mode)_N256 (IF1-CAM1)			
Source data pat				
P1	X:207 Y:155			
P2	X:19 Y:27			
Distance (mm)	88.8429311			
Average velocity	1.423966125			
Name	Time 1 (ms)	Time 2 (ms)	Time difference (ms)	CV (m/s)
AP0	940.1833637	1002.376699	62.19333534	1.42849601
AP1	2941.56714	3004.565097	62.99795658	1.410251
AP2	4941.710159	5003.664777	61.95461738	1.43400016
AP3	6942.633474	7005.941476	63.30800204	1.40334442
AP4	8942.920289	9005.097791	62.17750201	1.42885977
AP5	10941.11235	11003.32786	62.21550201	1.42798705
AP6	12942.82892	13003.88542	61.05650197	1.4550937
AP7	14941.88548	15004.21412	62.32863837	1.42539503
AP8	16942.6378	17005.99439	63.3565982	1.40226801

(4) Spatiotemporal plot

Right click on line and select [Spatiotemporal plot]. A spatio-temporal map showing specified line (pixels) on vertical axis and time on horizontal axis is displayed, and temporal change in brightness of pixels on line is shown in pseudo color.

299.25 ms
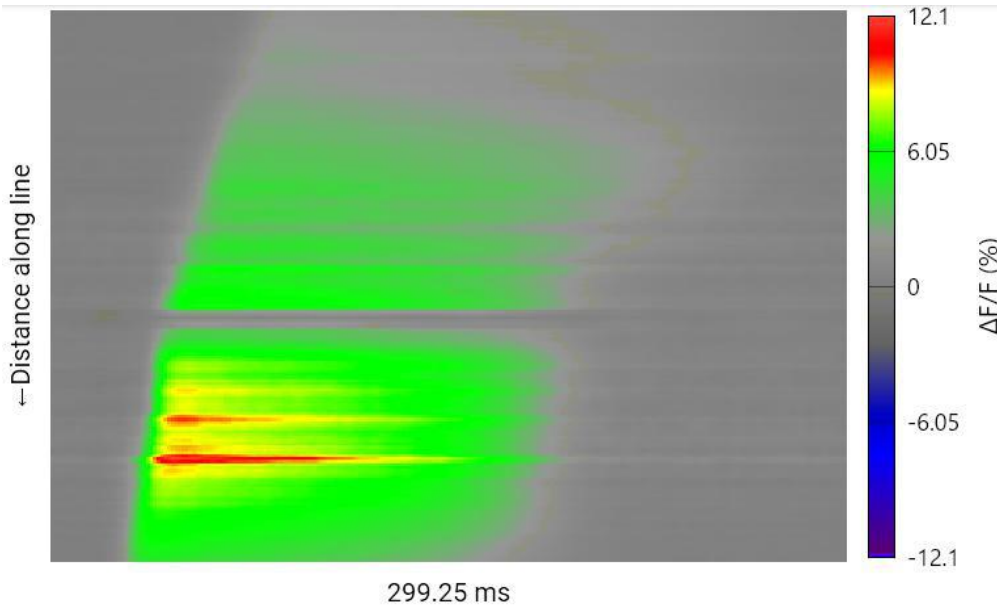
Operation	Description
Right click	Save data: Save map data in CSV format. Save image: Save map data in image format (png/bmp/jpg). Edit color: Change color map.