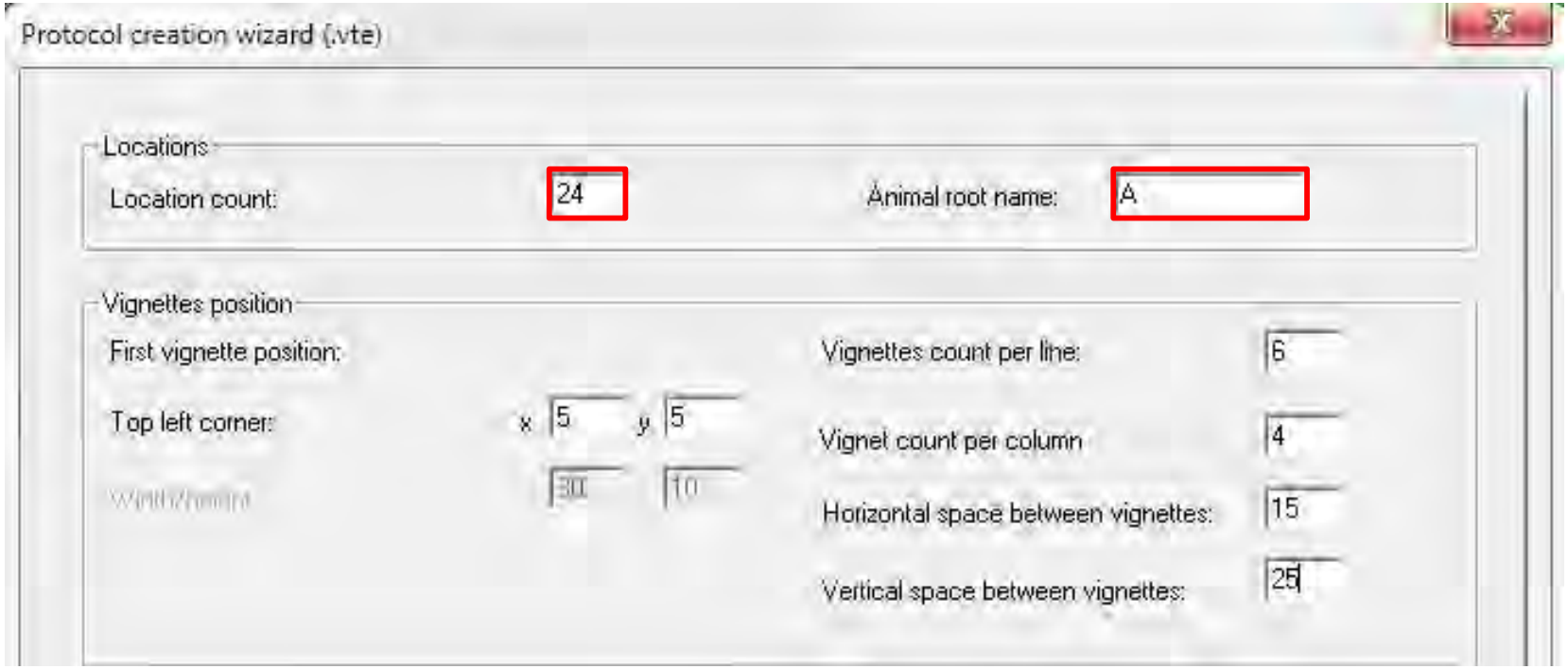
2. Q 0 ÔPÂ ï ~

1bA!› Æ ^ A | c Đ • ÔPÂ Š ¦ ¬ JEÉ › Š5L -



2. Q 0 ÔPÂ ï ~

A. ï ~ ø ¦

æ 0 ï ~ :

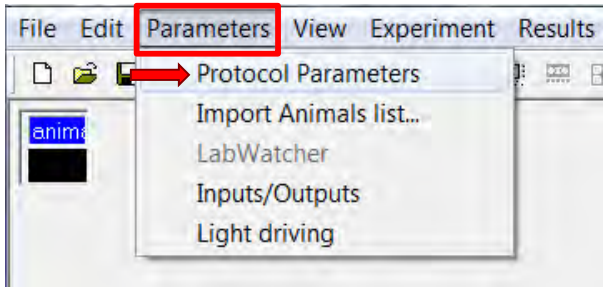
Q 0 6 ` æ,º ï ~ Đ • ï ~ ø ¦ :

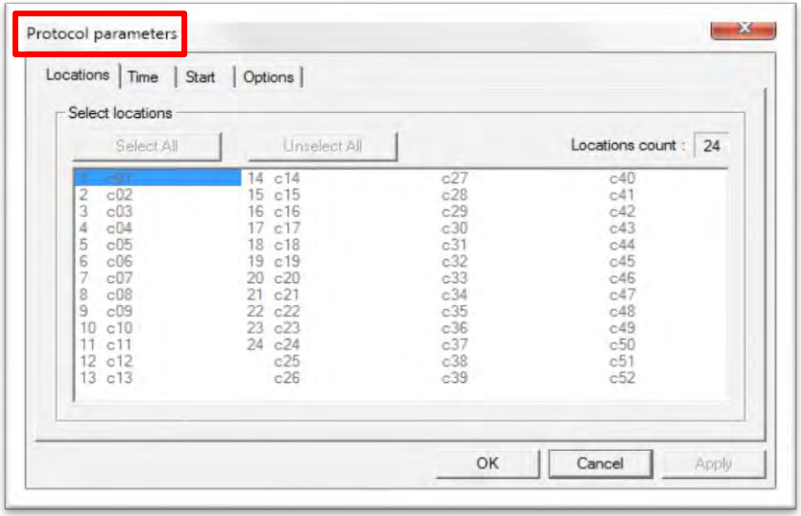
- ƒ5¤

1b5!› Æ ‰ 6 _ W Œ u F?N¯ Æ A,º _ W Œ } ‰ } Œ u F?N¯ • _

^) 4 c %?÷ 24 Š,º ƒ5¤ (5 Đ • Â " , 68b!š : ' ‹/p , C73 • $ o .

- ,L*
- 6
- F?N¯





2. Q 0 ÔPÂ ï ~

A. ï ~ ø ¦

Q 0 6 ` æ ,º ï ~ Đ • ï ~ ø ¦ :

- ƒ5¤
- ,L*

1b6!› Æ ^ Protocol ‰ Œ u *ÈF?NÈ ¯ ¯ cAô Đ ÔPÂ 75# ,L* Â ¦ ¤ ª > ž U*

ÔPÂ 75# ,L*: e = ª ` ÔPÂ,º 75# ,L* .

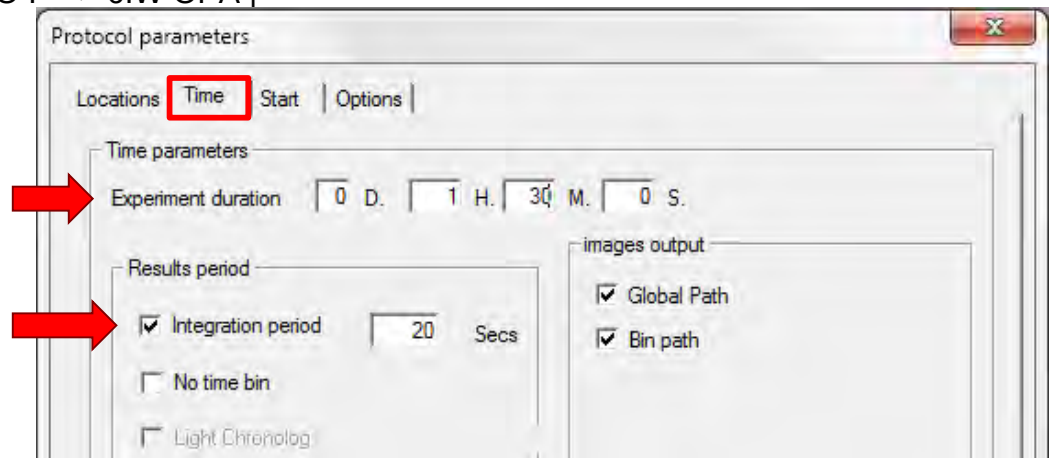
© µ vAô Đ,º ÔPÂ 75# ,L*" ÔL{,º ÔPÂ ,L*Kµ ¸ ^ ÔPÂ4þ!˜,º , O ¸ < ÆE¥ , • P8 Þ4þ!˜ >

!š : v ?,º0° r »G38) G?· ¡ Ï ¦ • 0 ¸ \ O315 < t/p error ¥ >

¦ ¤ ª > ž U : ÔPÂ ¦ ¤ ^" `Aô5¤ ³,º ª > U5 • , t/p .

^ 6 ` ,L*Kµ Ü p 1 E , 30 <JÕ,º ÔPÂ c ¸ " 200 JÕ P ª > 6!W ÔPÂ ¦ ¤

- 6
- F?N¯



2. Q 0 ÔPÂ ï ~

A. **ï ~ ø ¦**

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Q 0 6 ` æ ,º ï ~ Ð • ï ~ ø ¦ :

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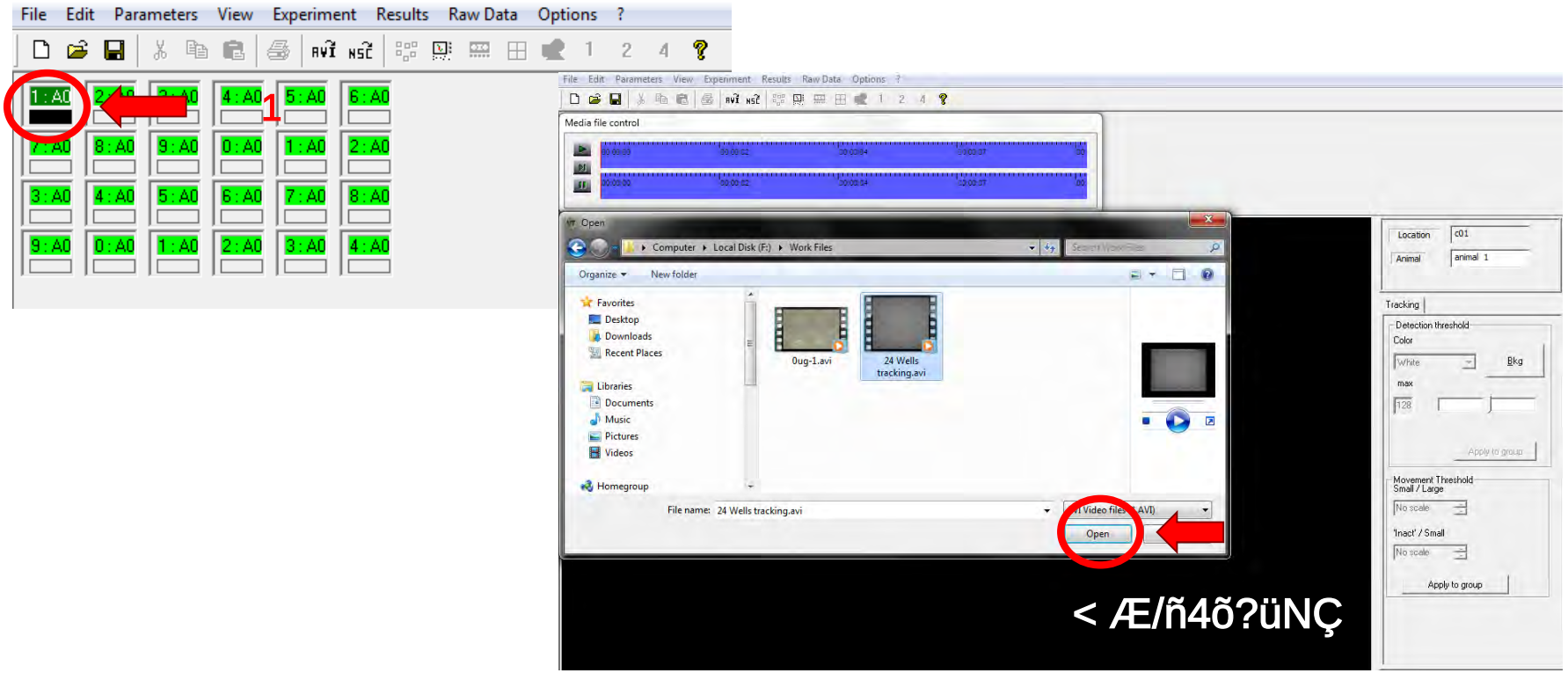
- ,L*
- 6
- T ¾té¤$ #Ä„çNšBA,<HNté¤$ #Ä„çNšBA,<HNtéàpšBA ¤ @ ˜ Ãôé¶ôEÁ× •çNžL Ñ~ à$

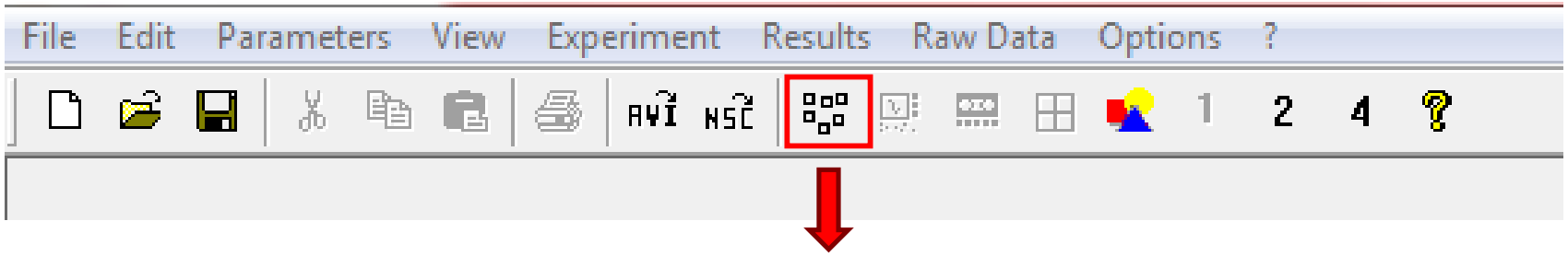
2. Q 0 ÔPÂ ï ~

¸ A 4 v/p¸ % 1 Š4ú,º1b 6 r¸ F ›) A 4 c,º < ÆAô Đ W E .

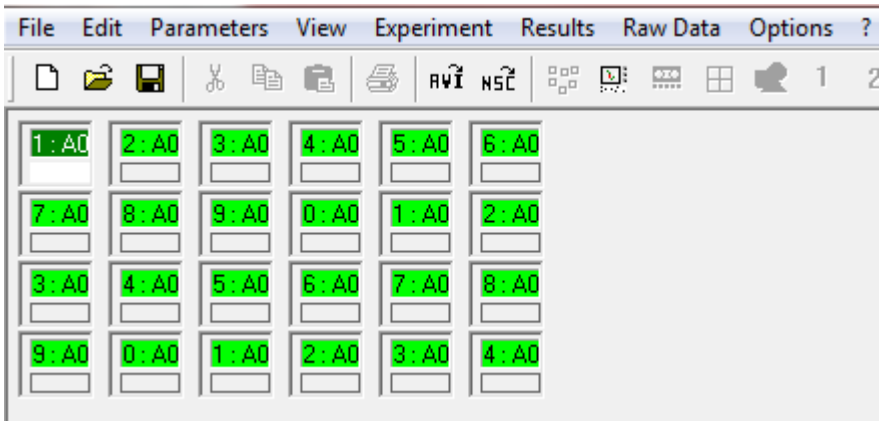


2. Q 0 ÔPÂ ï ~

B. H 0?· < Æ,º p

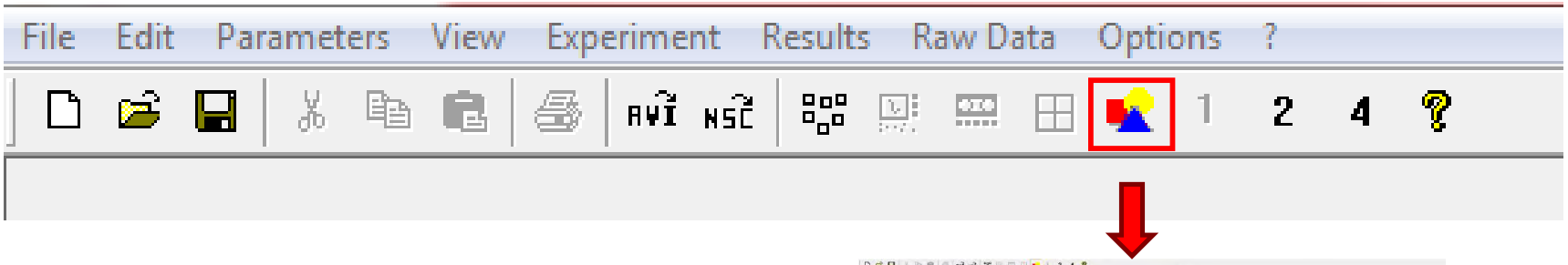


% = ~ f Š4ú 4 _W E

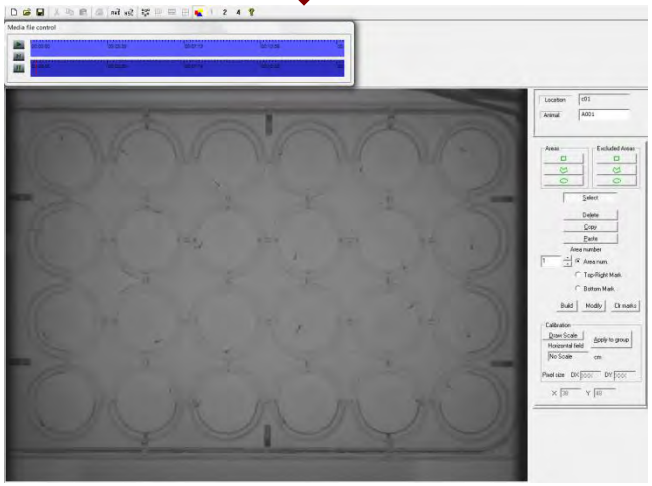


2. Q 0 ÔPÂ ï ~

B. H 0?· < Æ,º p



% = ~ f H < ÔPÂ p _W E



2. Q 0 ÔPÂ ï ~

B. H 0?· < Æ,º p

1b9!› : AM˜ •] ì 6 `1¶ L ¼,º H < p ,º ï# Æ

[*A!›PÚ ~ Ò 4B- ?÷ A 4 v /p*]

1 *µ ^* Area num. _ *Eï,º < ŠH &ï 1 D ¸ ^ Š µ 4 6 @ ï,º Š @ H >*

2) *^* Top-Right Mark _ *Eï,º < Š H &ï 1 D ¸ ^ Š µ 4 6) @ ï,º Š @ H >*

3) *^* Bottom Mark _ *Eï,º < Š H &ï 1 D ¸ ^ Š µ 4 6) A ï,º Š @ H >* .

[*A!›PÚ ~ Ò 4B-?÷) A 4 v/p*]

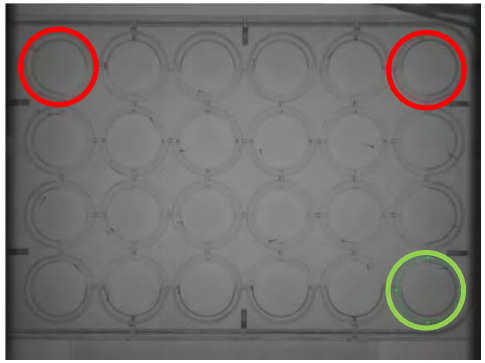
4) *&ï 1* Build _ *6!W] 01 žG* 24 *Š,º p*

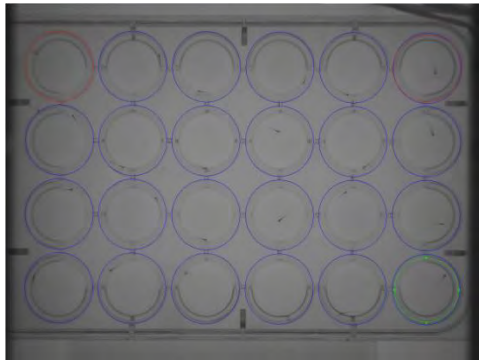
5) *&ï 1* Clr marks _ *6!W]$;Lš v ?,º =Aæ*

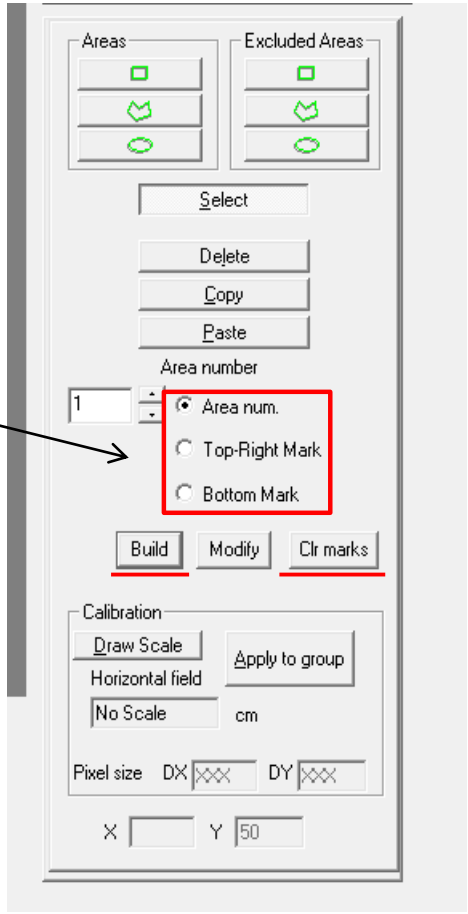
B-# E:

¾ *žG* 24 *` p ,º p . e o ¤ @ ï p] E 01 ,º >*

¾*&ï 1* Select *% 01 Þ L6; o p ,º] E* , *&ï 1* Delete *% VLš H ³,º p >*







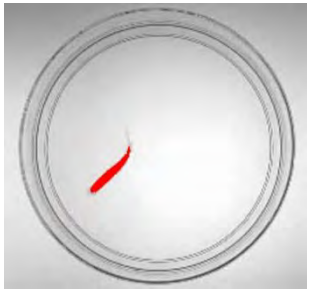
2. Q 0 ÔPÂ ï ~

B. H 0?· < Æ,º p

æ 01 ,º p 4ú Ê B e Â" 6 ` ŠF „ Â5Ä,º cGƒ @,º.

p ÊB e H ^R² bDá Â ¹,º ^ ŠEï,º H § • L*,º .

2. Q 0 ÔPÂ ï ~



1b13!› ÆAôÐ- #• j+, r

- #• j+, r :

- #• j+, r é Ð ¼ Þ(Ÿ>á- #• f,º %73] .(z j&« … Ü)
ZebraLaËE¥ , P 8 Þ p a 4 c,º7 ¥ Â Þ(Ÿ bDá .
- #• Ñ e Þ(Ÿ bDá ¸ Ñ e7 ¥ .
‰ Þ ^B9 ª j+, r,º , O ¸ >á ö#• f,º01 Þ,º(Ÿ ‰ P ^?ü 4 @ 4Ø8¨?¼-.
j+, rCÀ „ ¸ … U ÜCÀQ
FPn û ë A ¸ j+, r PB9 ª f 5-50) .

Þ(ŸDá ‰,ºNÒ8¨

Þ % F? C BNÒ8¨,º Þ(Ÿ › • < Æ .
FP n û ë A ¸ ÇP¢R² P ~)æU 8¨¸ G ¦ û ë A eFE D8¨,º .

B-# E Æ

G " 0Aä Þ ^F? ÇP¢R²,º j+, r , ¸ Að ÇP¢R² bDá eU 8¨ L6;FE D8¨ ¸ ^F?N¯H ¸
4þF? FE D .

1b14!› : &ï 1 Ê+^ f4ú (Applyto group)

2. Q 0 ÔPÂ ï ~

B-# E ¸ A 30 e" E¹ n?÷,ºAô5¤ j+, r , P +U,º û ë Æ

j+, rAô5¤,º ` „ j+, rAô5¤,º E¹ ³ j+, rAô5¤,º `Q

2. Q 0 ÔPÂ ï ~

*1b*15*!›* : *Aô Đ E Þ(Ÿ,º$n Þ* / *01 ÞFU ÜL> r*

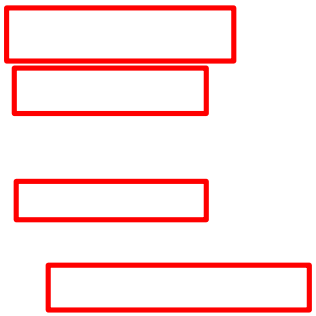
- ‰,ºL> r?· o ¤ ÔPÂ-$ =6B Đ

*1b*16*!›* :*&ï 1 Ê+^ f4ú* (Apply to group)

B-# E Æ

^ Þ&ï 1 ‰ ‰ o Ç š }• ƒ P¸ E- }×µû‰ ‰ _

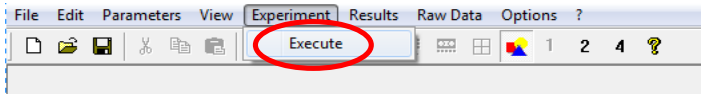
^ Š4ú 4 W E A v ? Þ?·- #•,º Š ƒ (5 >áF? p558¨ ¼ >

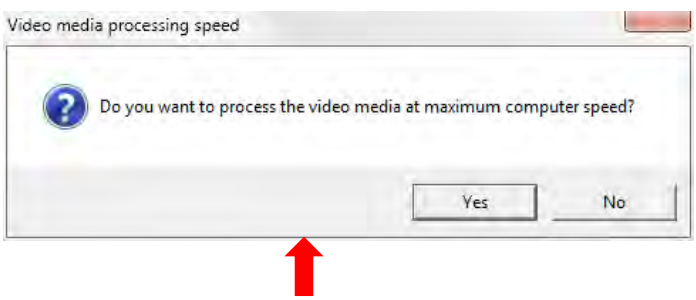


3. ÔPÂ W E

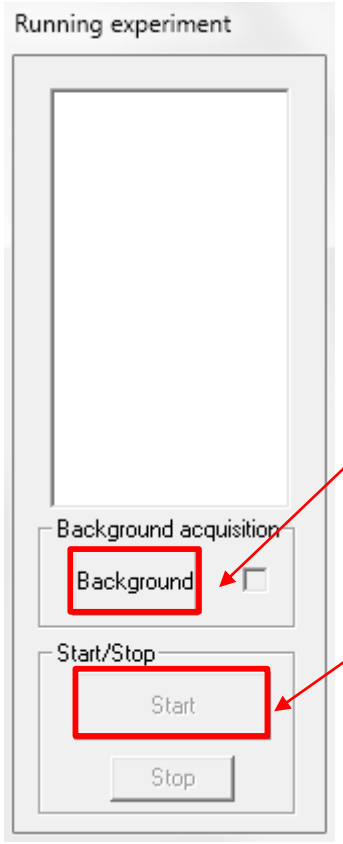
*1b*17*!›* : *Ž Þ,º* protocol:
Ž vtr r E,º ½ ,'l D 6 GýLü ¦ ¤ .
&ï 1 « File» : ‹ A,º « Save Protocol As

*1b*18*!›* :*&ï 1* _ Æ ‰ ŒÑ ūA,º š Æ µ š
… ‹ c,º ,JÕ,º 0)æ>ž/p Þ (5 F › ÔPÂ W E ¼ .





¸ Ò ÞF >„º e/ñ4õ < Æ ¸FÙ ~ Þ % F? e \
+k7G v ?,º 6 !FU Ü L6;?üNÇ,º!™ nFU Ü < Æ >



*1b*19*!›* :*&ï 1* _ l P Œ } ¡*?Jä* _

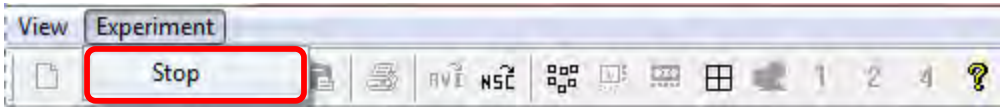
*1b*20*!›* :*&ï 1* Start *?Jä*
, JÕH ,º ¦ • t/p p4Ø8¨ ¸>ž/p ÔPÂ (5 6 ¼ .

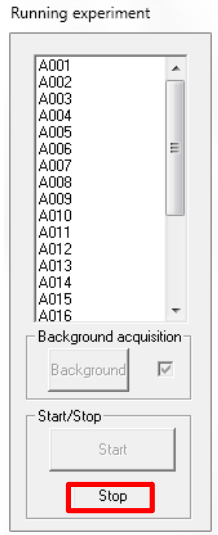
3. ÔPÂ W E

} Aô!š , Þ?· ¸ ' ÔPÂ Æ 1b21!› :&ï 1 _ ^ š } ?%Jä_

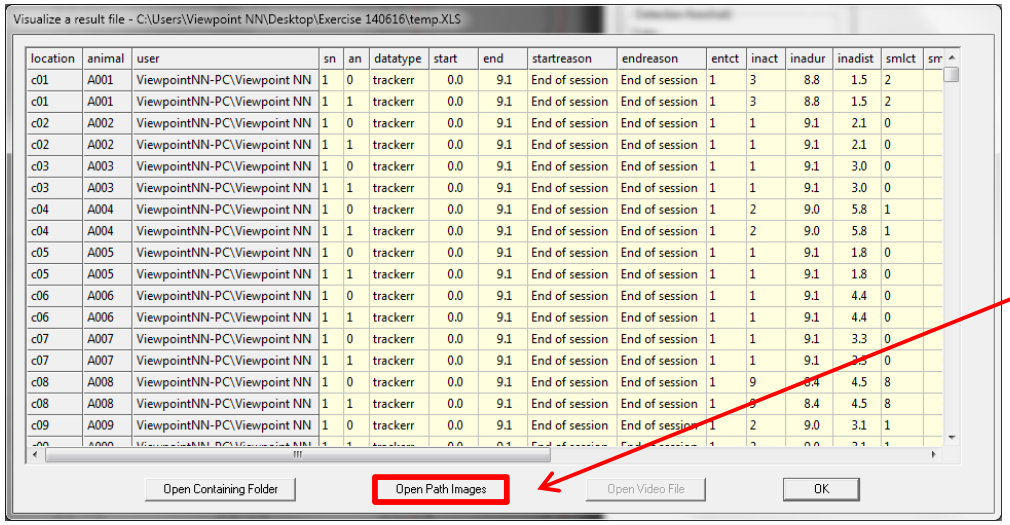
} Aô!š , Þ ?· 4þ!˜ ÔPÂÆ

1b22!› : ~F >,1b 21!› c,º ' ¸ ÃF? _ Æ ‰ ŒN¯ ūA,º š_ ^ š } ‰ _





F >,1b 22!› c,º ' D ¸E¥ ,8 Þ+U F ÔPÂ5 Ò (¸ A 4):



location	animal	user	sn	an	datatype	start	end	startreason	endreason	entct	inact	inadur	inadist	smlct	sm
c01	A001	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	3	8.8	1.5	2	
c01	A001	ViewpointNN-PC\Viewpoint NN	1	1	trackerr	0.0	9.1	End of session	End of session	1	3	8.8	1.5	2	
c02	A002	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	2.1	0	
c02	A002	ViewpointNN-PC\Viewpoint NN	1	1	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	2.1	0	
c03	A003	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	3.0	0	
c03	A003	ViewpointNN-PC\Viewpoint NN	1	1	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	3.0	0	
c04	A004	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	2	9.0	5.8	1	
c04	A004	ViewpointNN-PC\Viewpoint NN	1	1	trackerr	0.0	9.1	End of session	End of session	1	2	9.0	5.8	1	
c05	A005	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	1.8	0	
c05	A005	ViewpointNN-PC\Viewpoint NN	1	1	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	1.8	0	
c06	A006	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	4.4	0	
c06	A006	ViewpointNN-PC\Viewpoint NN	1	1	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	4.4	0	
c07	A007	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	3.3	0	
c07	A007	ViewpointNN-PC\Viewpoint NN	1	1	trackerr	0.0	9.1	End of session	End of session	1	1	9.1	3.3	0	
c08	A008	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	9	8.4	4.5	8	
c08	A008	ViewpointNN-PC\Viewpoint NN	1	1	trackerr	0.0	9.1	End of session	End of session	1	9	8.4	4.5	8	
c09	A009	ViewpointNN-PC\Viewpoint NN	1	0	trackerr	0.0	9.1	End of session	End of session	1	2	9.0	3.1	1	

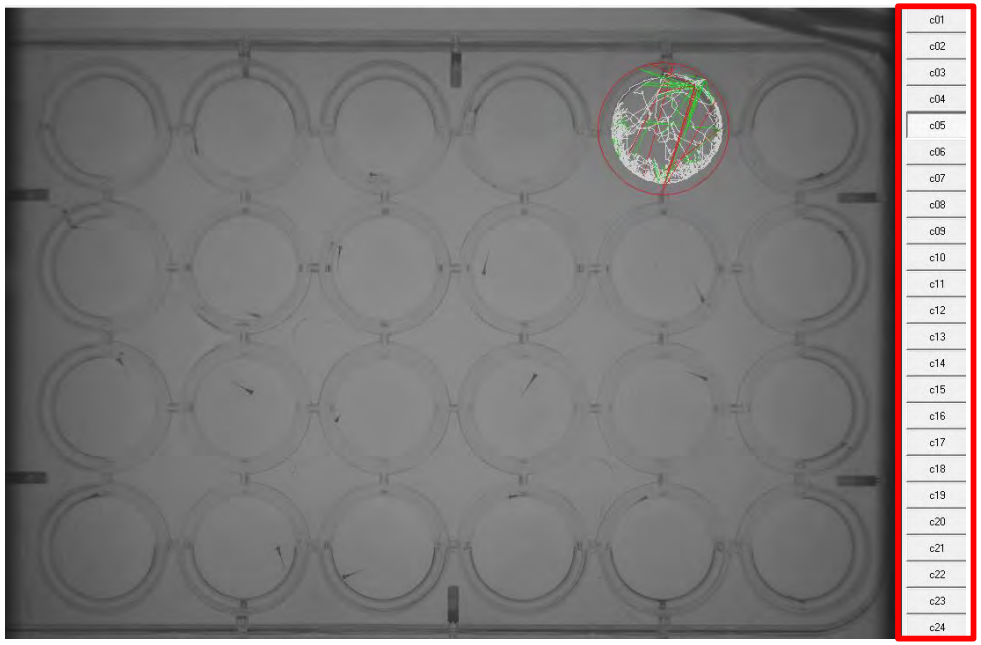
1l23!• Ö &é+ _ K ‰ v W š Z 9JÞ P

3. ÔPÂ W E

B-# E Æ

1. ^ ÔPÂ W E A ¸ % ? A) 4 c,º

C01, C02, C03 ?Jä B ,?ø " ` Š ƒ,º < Æ û ë >



2. &ï 1 _Open Path Images?Jä D ¸

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1b 60 ÆBin Path

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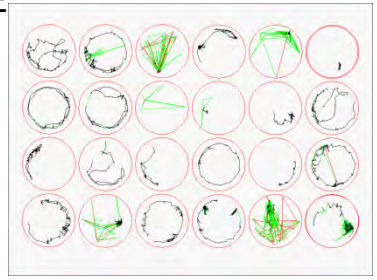

1b Â0 ÆGlobal Path

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4. 9ç Ï û ž

B. Ï û ž,´ n

Gý Ý Ï û ž,´!•PÔ ² ; p/j :

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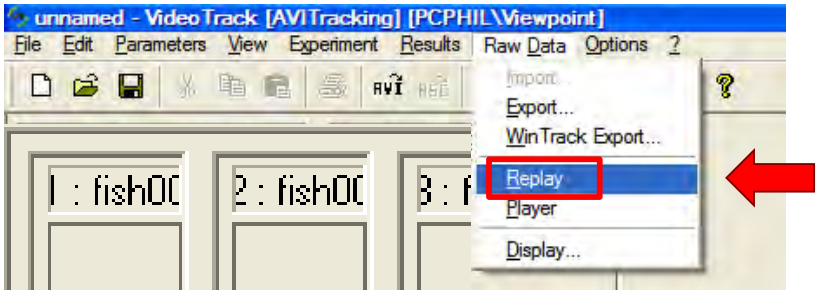
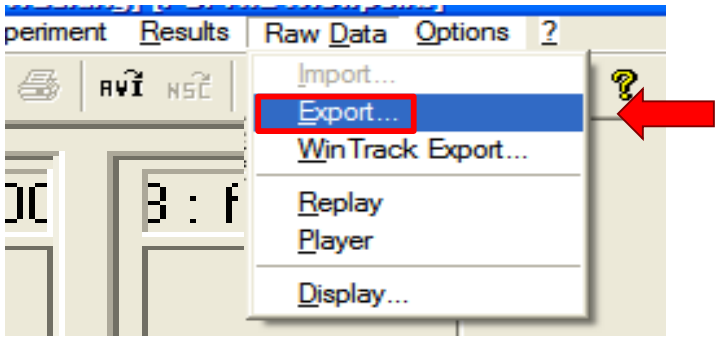
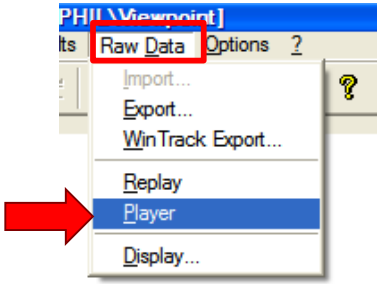
- ƒ 0 Raw Data … ;,´ ReplayRaw Datamenuƒ > 9 ; Replay
- Õ ; • 9 ; Raw Dataą,´ ExportÈ 0 >F9 +O @,´5 Ì · &
- Ø 9 ; Raw Dataą,´ DisplayF65 , • ` 0 Z+e €>˜ l F655 AÑEŸ & .





4. 9ç Ï û ž

c. Ï û ž,´ n



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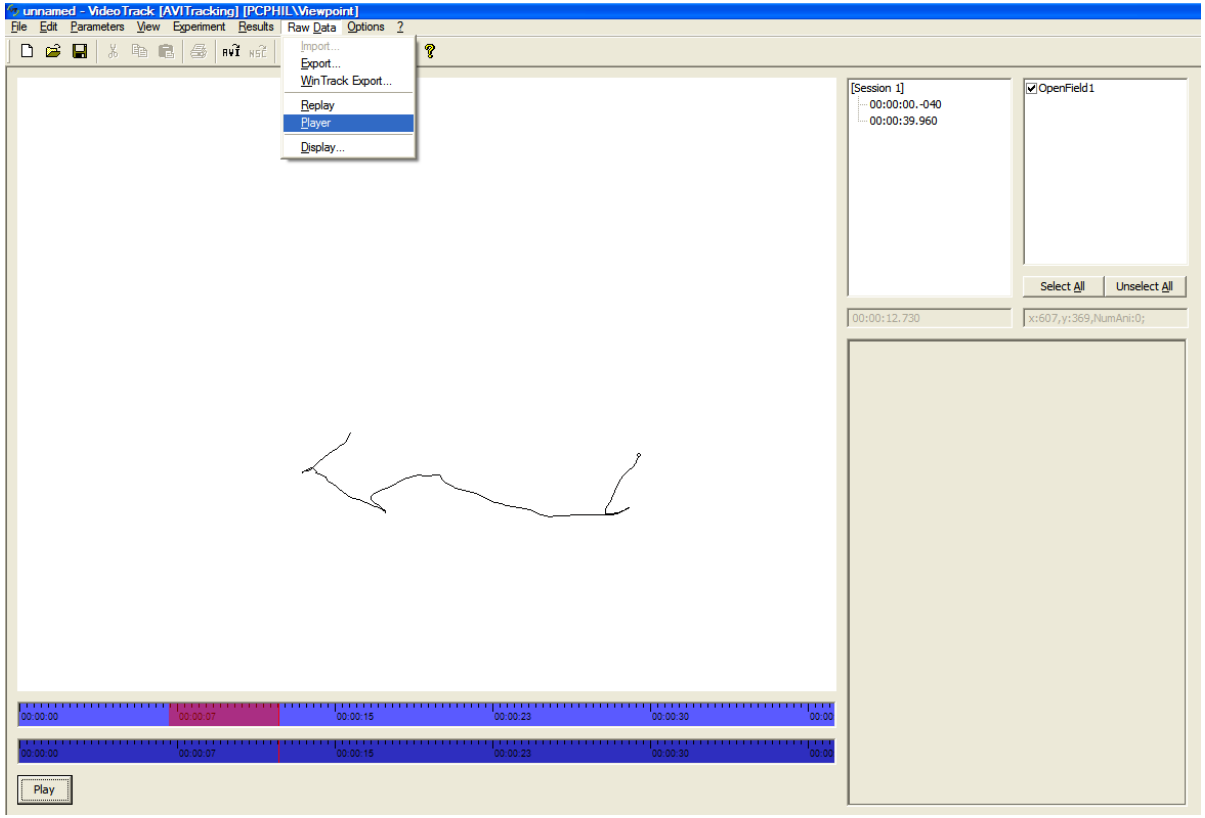
ž È < &- × ÎP¼ _ ²
… …,´ .



5. Ø(™ G>˜

!”N© Ï7- _ º Ø(™ 6G} `(© Ê }5ž .
Ø(™ G>˜ FJE÷ 0 Z f>˜1V 6LÄ,´ · & (txt file) • { Ø f Œ F65 Ø
(™ G>˜ K * A ,,´Eµ Ù é ? ¼ @ .

j ¶F-"rF 0!•,´ ö.ž W ¼ Z W F
Aî5ž,M0?±+X 0 Z+e €>˜ l • { Ø5FEÁ
!ÿ Z Ø(™,´ l .

5. Ø(™ G>˜

!ÿ!Q ÎP¼,´ Ø(™ Gÿ ¼ k,´
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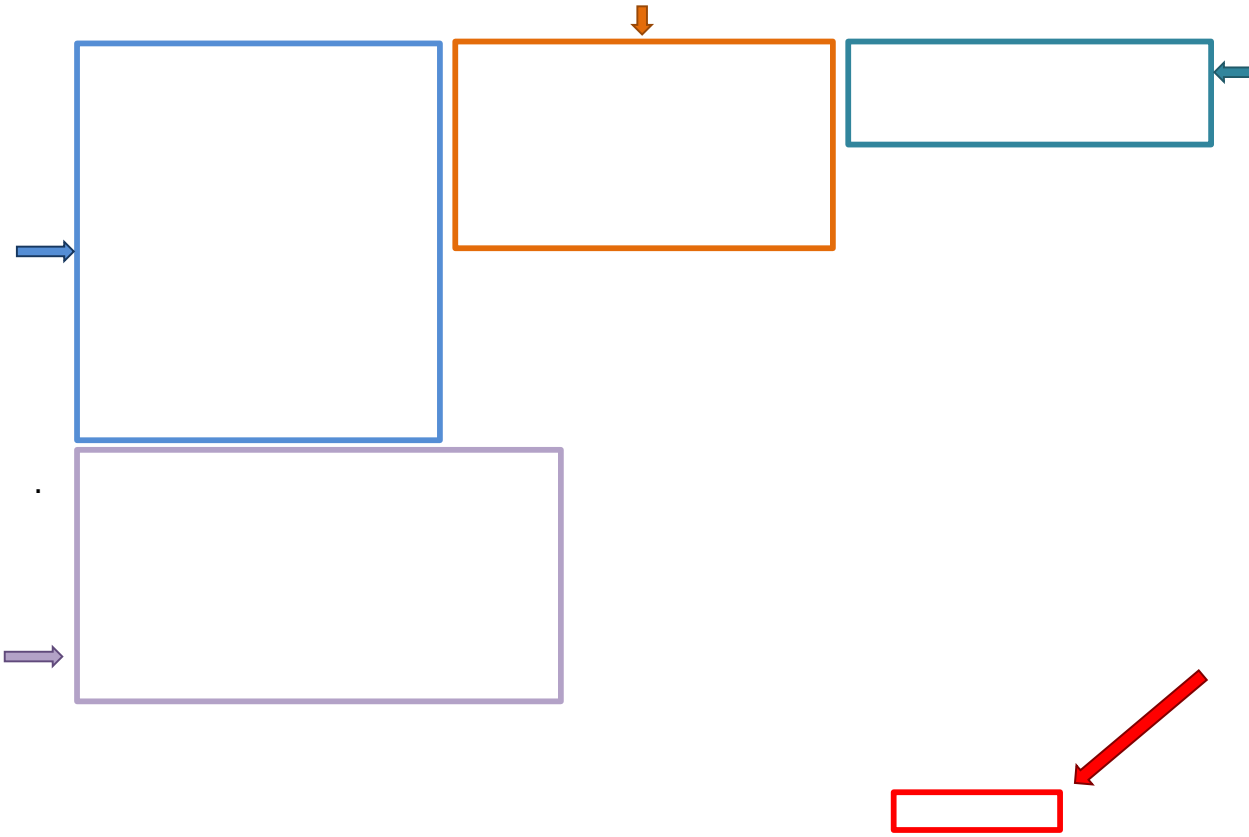
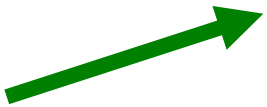


1. D DZ



1. D DZ

X ÎP¼5 Ì · &] :

, •AÑ : !ÿ!Q Ø(™F • 0 Z j ,´!Q

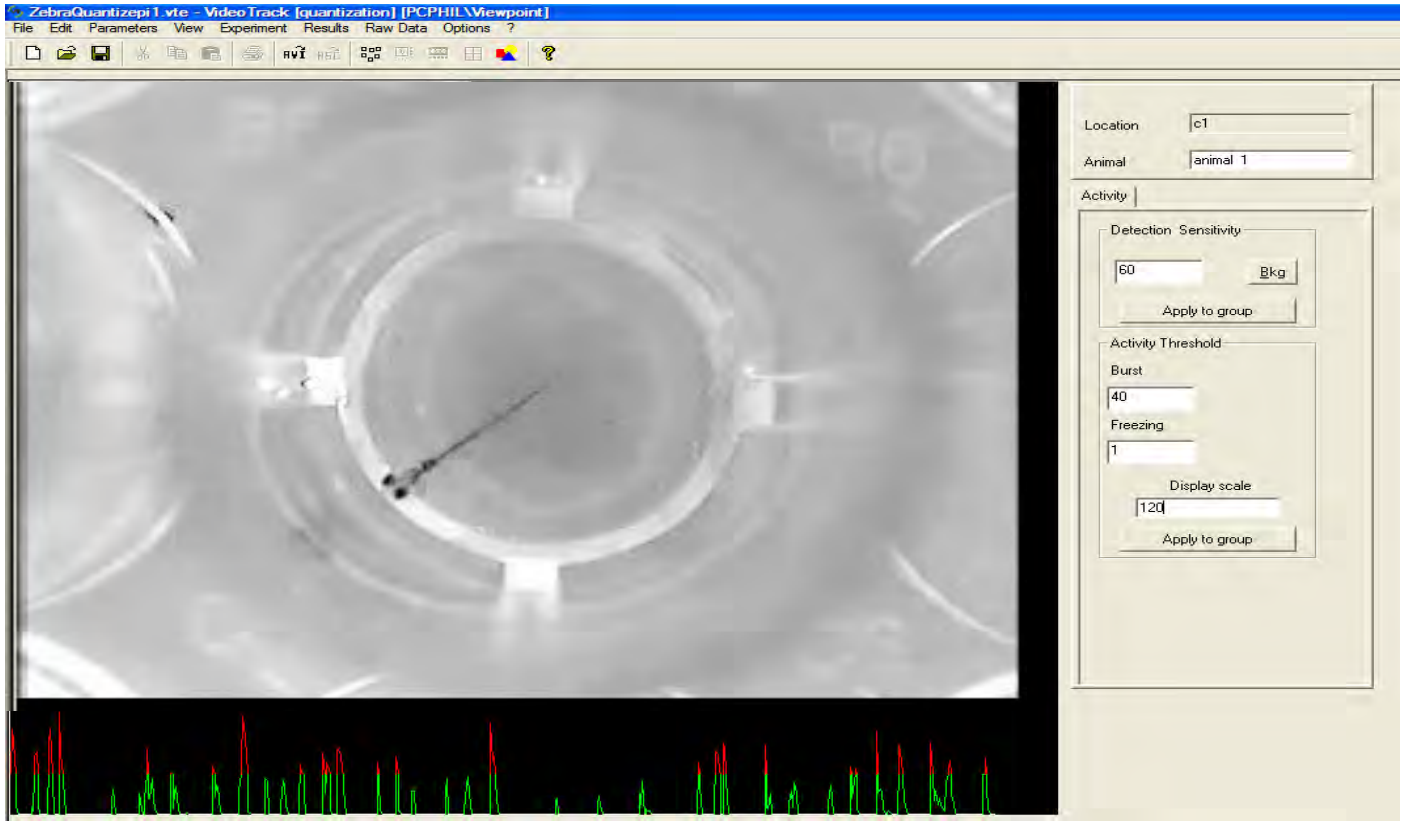
inact: M‰!’AÑ .
inadist: M‰!’],´ Ø(™?¶- ,´ kD /ë .
inadur: M‰!’(æ 1] ÖE÷,´ k &K¯ .

smlct: ?F ØAÑ .
smldist: ?F Ø],´ Ø(™?¶- ,´ kD /ë .
smldur: ?F Ø(æ 1] ÖE÷,´ k & K¯.

larct: WF ØAÑ .
lardist: WF Ø],´ Ø(™?¶- ,´ kD /ë .
lardur: WF Ø(æ 1] ÖE÷,´ k & K¯.

emptydur: X j µ"Ñ 9)B‘ / Ø(™>Û ð#{ `,´ &K¯ .
emptyct: X j µ"Ñ 9)B‘ / Ø(™>Û ð#{ `,´ !Q .

2. Gÿ F

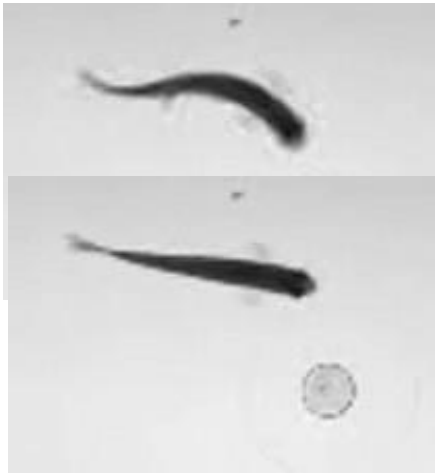


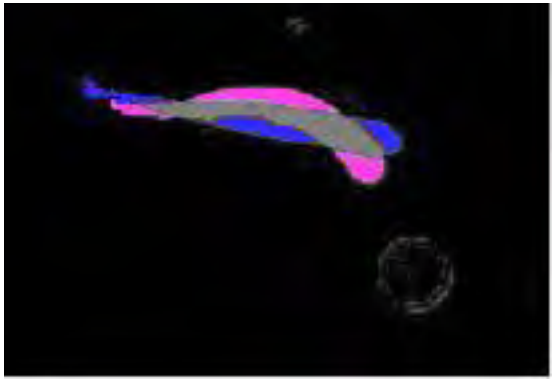
Gÿ F ÎP¼Lö] X Ø(™ ,´#k Ø0; Ö : .

#k Ø0; Ö X . ÿ ; é +X"4ï n /j .

_ Ø(™ XR¬5h µ,´F Ø kGÿ ¼ ³,´NÁ)· .

2. Gÿ F





Gÿ F Ï I :
2¹8¢ : x },´ }5ž
; 8¢ : à,´ }5ž

5/8¢ + ; 8¢ =>| j

& 8¢ : Z ,´ ÿ3P

E÷%ð>| j

]1y>| j

2. Gÿ F

>| jE÷ Ö d+| l

F Ø lQ ¾ d+| l & ,>| j "4ï n/j j4Ò8¢ ,F >˜ ¶E÷ Ö>| j .

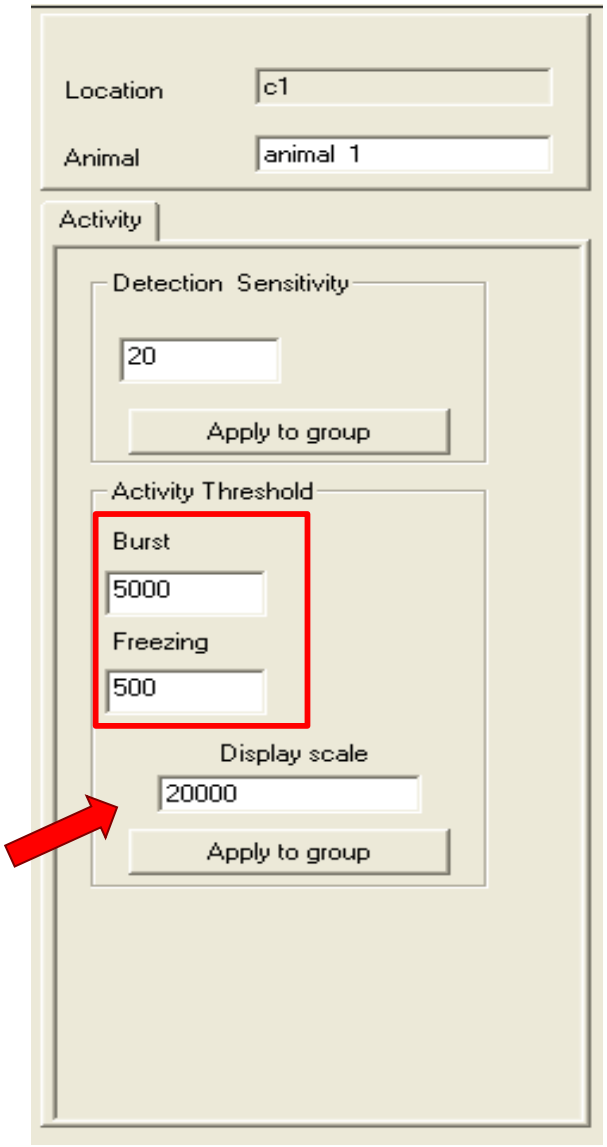
ë5 d+| l

F Ø { ~ ¾ d+| l & , >| j "4ï n/j j,-8¢ , >˜ ¶M‰!'(æ 1 .
X T Z d+| l *ƒ*],´ , >| j "4ï n/j j5/8¢ , F >˜ ¶ Ø(™ X!“ h>|
j(æ 1 .
²?±B3 ¤ d+| l , º 0 Z Ø(™ n XR¬5h] È'f > i ž8 ! { Ø 7-
Ç `,´ l •B3 ¤ d+| l Eî ` #?±,´ x Ì .

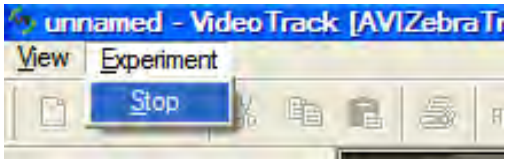
0 < F/B < B

n/j Q ? :

Ê y X "4ï0Ç n/j,´ 0 W>| j l ÈFÓ x ²-$E¤ n/j,´ "4ï 6
J n/j 0 Z þ 0 ` Ï 0 W l Ð,´ "4ï . £ ¯ "4ï . :-; = ` W ¾ 0 W
l,´ "4ï , ³,´ ÎLu lF _ J X+O @,´ Õ z] n/j * • .

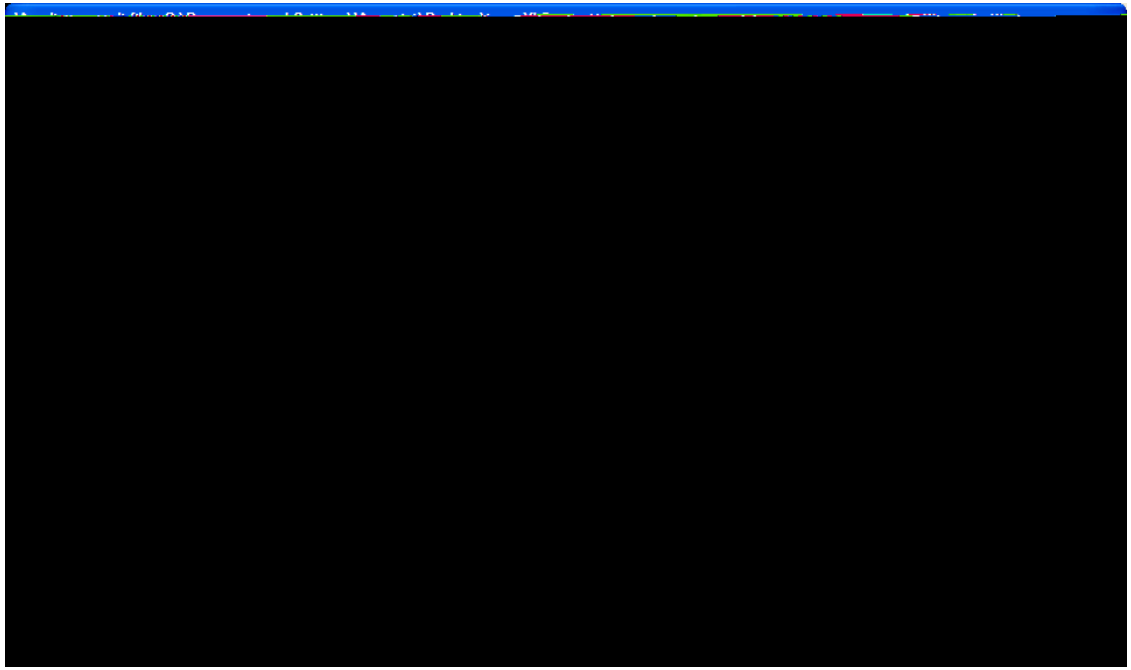


2. Gÿ F



4ø!’ Ø,´ ÎP¼ :

Î P¼ ž 6 X ÎP¼5 • & *)à X 0 P Excel˜ lGü (² ; .).



n/j ÎP¼5 Ì,´ · &] 6 *)à

; Ÿ :

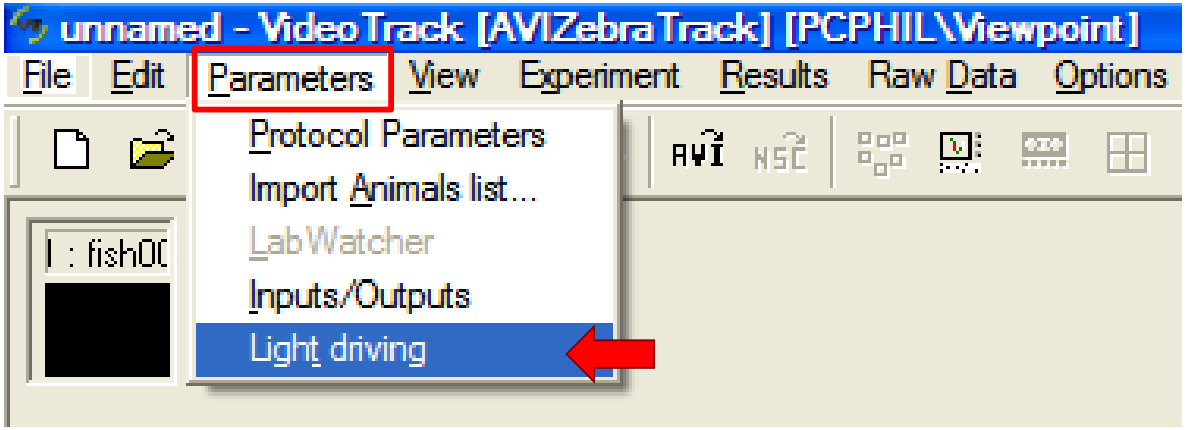
frect: ë5 AÑ
fredur: k,´ ë 5 (æ 1 15 &L$

midct:]1yF ØAÑ
middur: k,´]1yF Ø 15 &L$

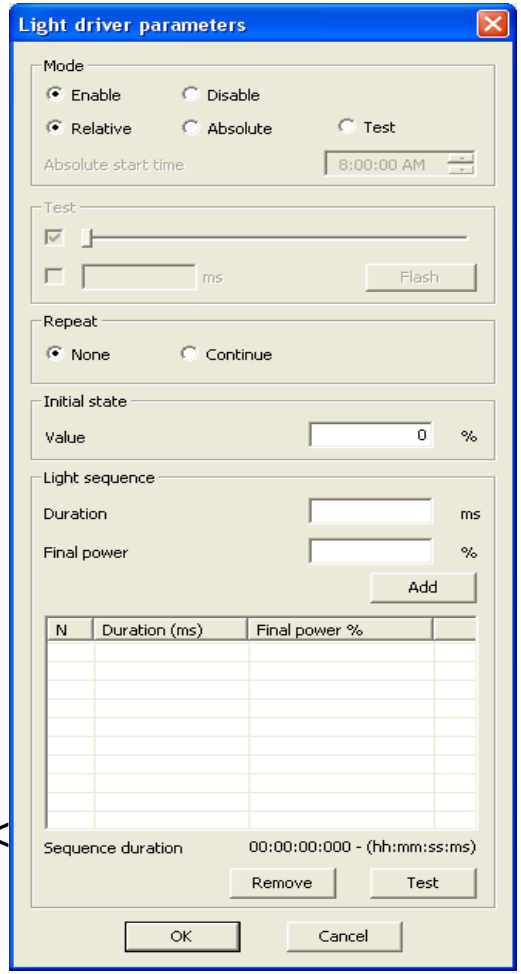
burct: —&øF ØAÑ
burdur: k,´ —&øF Ø 15 &L$

1. ¯+X'— >3+5

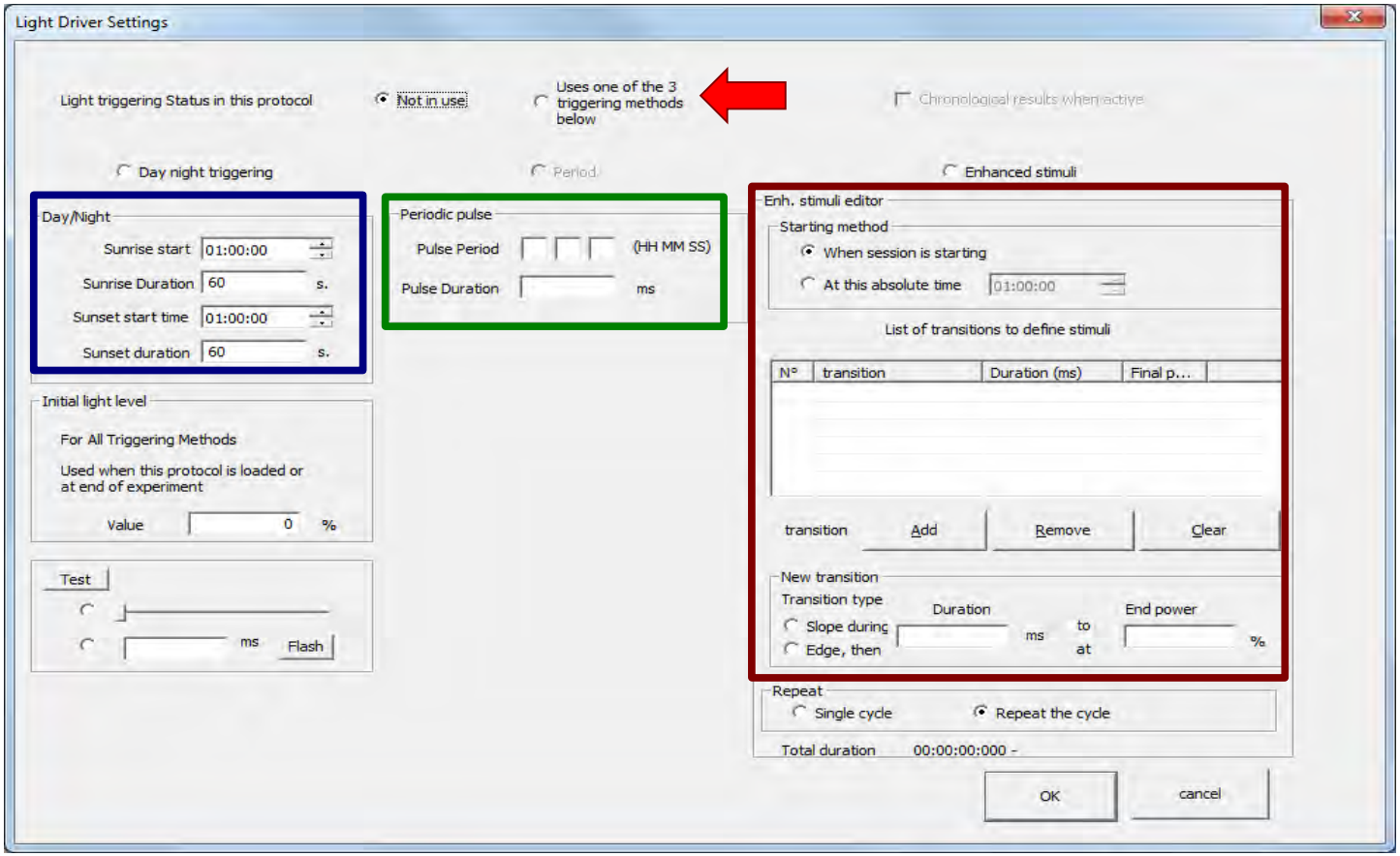
Ø × f zebrabox Gü,´'— >3+5 • ×+O l / L Ú)ß ÈL y È
Q * :m1y x Ì Y



?± X Ø,´ ÎP¼] ¯+X'— >3+5 ÈB' 9 ; Ö
W Œ u š Œ • W >] P Z š 'fŒA]ÎÀž]0v;P W W K <



1. ¯+X'— >3+5


Light Driver Settings
Light triggering Status in this protocol
Not in use
Uses one of the 3 triggering methods below
Chronological results when active
Day night triggering
Period
Enhanced stimuli
Day/Night
Sunrise start 01:00:00
Sunrise Duration 60 s.
Sunset start time 01:00:00
Sunset duration 60 s.
Periodic pulse
Pulse Period (HH MM SS)
Pulse Duration ms
Enh. stimuli editor
Starting method
When session is starting
At this absolute time 01:00:00
List of transitions to define stimuli
N° transition Duration (ms) Final p...
transition Add Remove Clear
New transition
Transition type
Slope during
Edge, then
Duration ms
to
at
End power %
Initial light level
For All Triggering Methods
Used when this protocol is loaded or at end of experiment
Value 0 %
Test
ms Flash
Repeat
Single cycle
Repeat the cycle
Total duration 00:00:00:000 -
OK
cancel

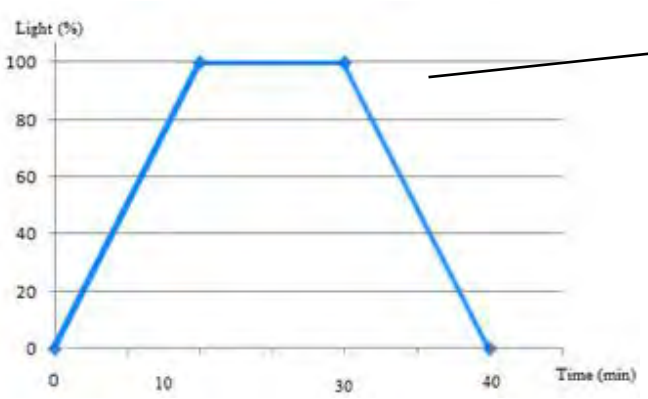
1. ¯+X'— >3+5

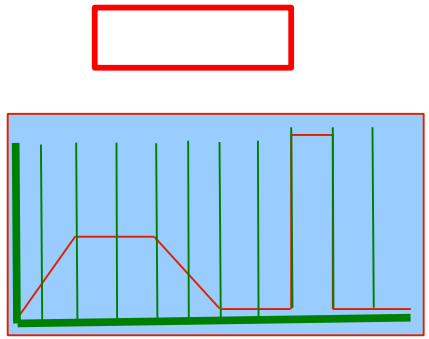
ØM0?±Aî5ž 0 Z'— > ¿ G

- 7- _ 0 ZGý = ¿ G F65 _ 0!Q W » & .
- M û(æ 1 l (0 û ‘ &)
- FJE÷ ; G!•PÔ.ž Ê Ø,´ ¿ G ÄFJE÷ Î Ð!•PÔ Å

93 »: L y ¼ 1 ? & l L Ú)ß È 9 * ¼ :m x Ì .

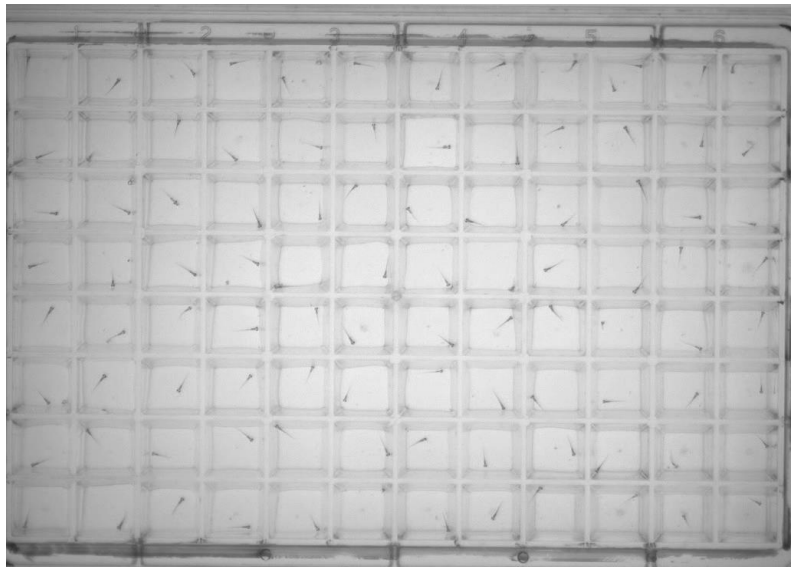
² Ì Ø #?±'— > ¿ G X ÎP¼E÷0;] Ú)ß,´B È.ž F9 Gý = ˜ O .





2. A ,´ ZebraBox

A ,´ ZebraBox_ ZebraLaþ4ô @G 6, ° ° _ v5 X 0C§,´ , ³ ¯ Ç A 7- OF >| ÁPœR¬ ¬R¬ ¼7 6þ,´8 Ø F?ò ¼D DZ . ZebraBox- OD DZ ¼Gÿ F ÁPœR¬ ¬R¬ X J „ ¯Gü,´F Ø"d £ X 0 - €Gü < & n • 96 Z Z *ƒ* .



2. A ,´ ZebraBox

Ï7- :

- Q 6EØ)· 6 À
- @ l / L Ú)ß
- XU Ç(æ 1 ;,´4Ò F4ï ð#{
- Â"d3+5
- y j%ð

Ä+X Î » :

- * 1‹
- 9Ÿ(™1‹
- ¬R¬,´F9 W }5ž •(a ÎP¼
- l L8² »

4. A ,´ ZebraCube

ÁPœR¬ @R¬>| j- #{ Ô

X 0 Z>| j – ÎP¼ ƒ] × f)ß ³ _ ¸ £K^,´ .
Viewpoint "4ÿ 0 ¶ 0/ý à,´ ?3+5 È 5 [¶ y × È × ¼ _ Ø
Ï 7-...

Z ?LÄL$ >Û$+ Ð ` 0 Z
… 0,´AÑ1Ç j] • 6 À JEî 64
‘ @R¬!

Aè J ý Œ ,´ é x 7-+a
ZebraLaŒŸ &Aî5ž '— > È N# È
+e j%ð.

5. t ÿAî 7

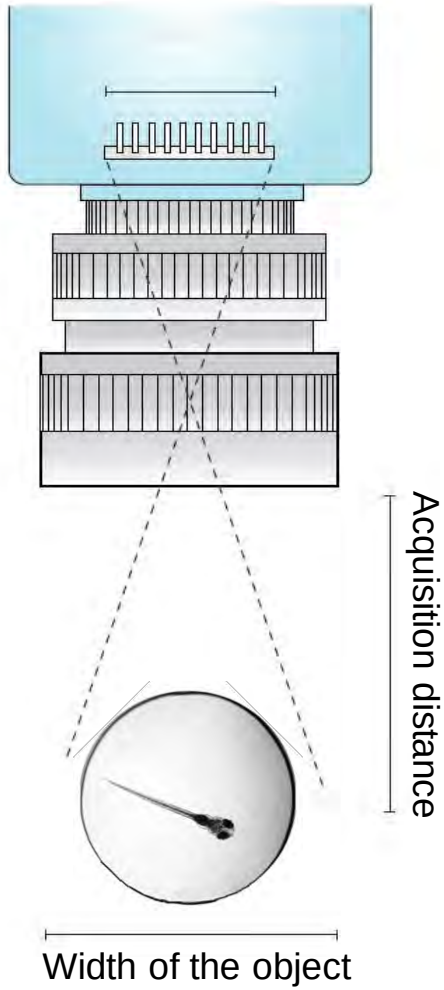
'VD _Aî5žKŒ d,´ k?±,´ ò .

$$'VD = \frac{J\ ¤\ å\ Y\ *\ CCD}{+\ »\ !\ †\ +\ CCD}$$

KŒ d,´'V&é ã ¾ Z 3P .

'VD K¯ ÖL¿-p µG s &0+ Ø6< F , (© [_FJE÷ ûEœ ¦ .

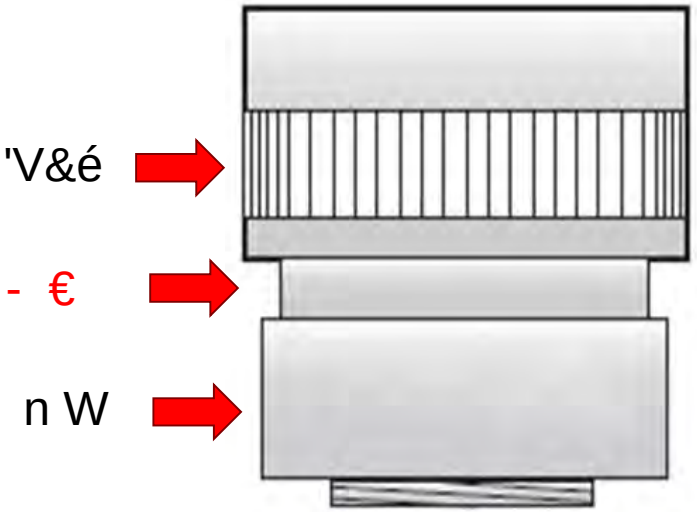
= <,´)ß õN«B3 ¤ `!“.ž,´'VD : Ç `$5 ,´+kM’ .



5. t ÿAî 7

'VKŒ d,´'V&éK¯ Ö = _ * Ê,´ ; 6< {,´ _ ³
FJE÷Eœ Ø = <,´KŒ 8 • Š 7 Ê,´ 0 ? ¼ 0 W
l {L$,´ i .

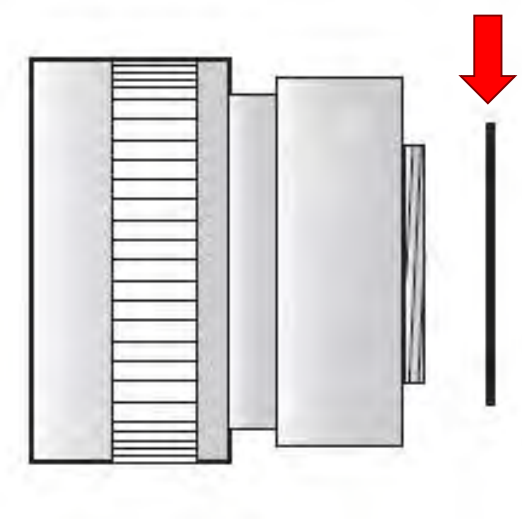
G &>Û0+ Ø ` 0 Z-( ) ¾ ¬!",´ }5ž : 9ç Ç 0
ZF 5 ,´'VD È !" X . ÿ5 5 1 X <D
0 Z . ÿ £M',´ *.p : n W =)· .

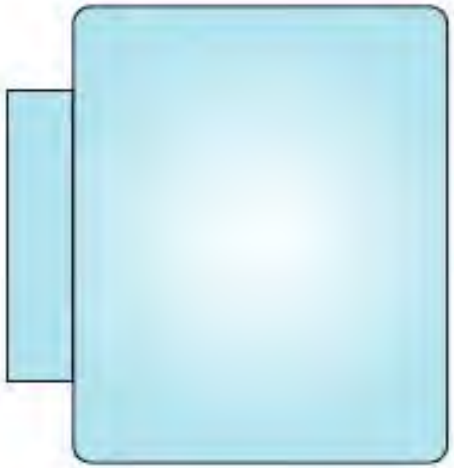


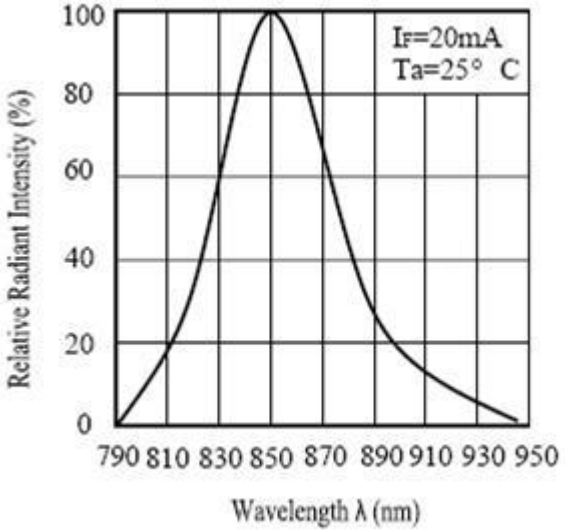
y 8)ß : 0 ZKŒ d,´ 0 _ 0 ZFJE÷KŒ dB38² y4ïFJE÷Gÿ,´
` é . ³ _+aKŒ d µ,´ ¯+X { B38²,´LÄ7Ì × f,´ .

5. t ÿAî 7

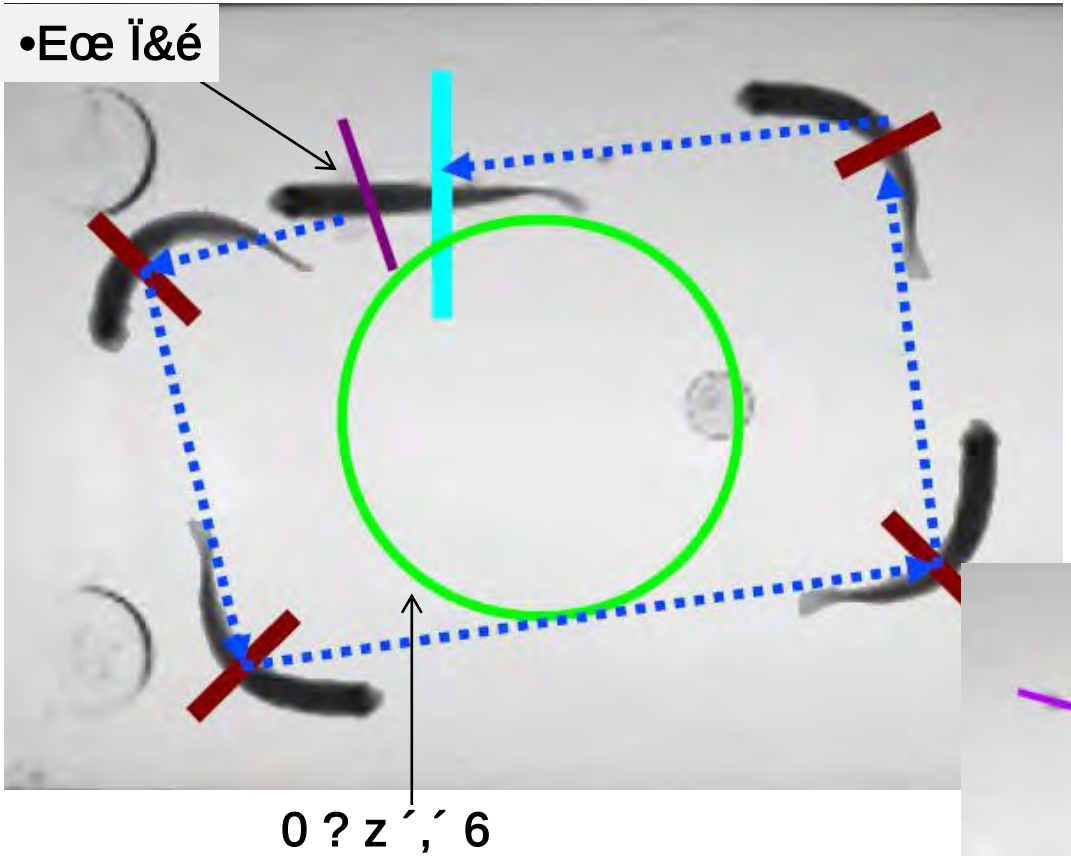
9 0 Ë A ,´ × ñ _ ¼4Ò F4ï'— >@ ã é x-(5 8,´ .
0 Z4Ò F% y ˜>Û ¹>õ XKŒ d µ ï AÙ4Ò F yF • ` CCDµ È ú fFP *
0 -,´ . ÿ$b ¼ 6 À x Ì .





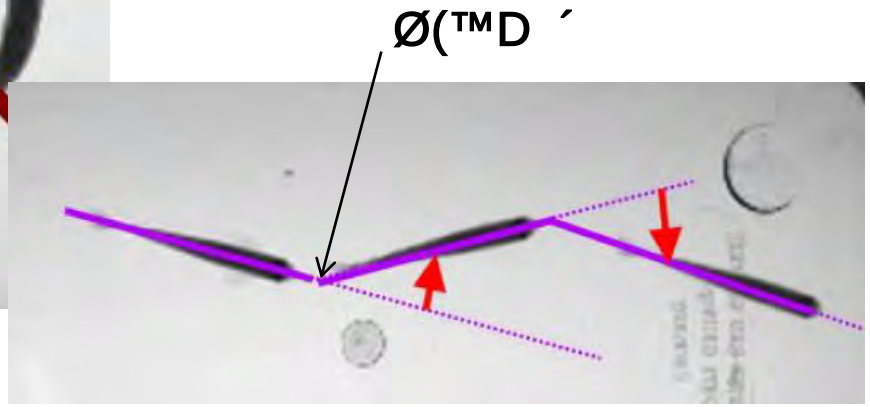


1. •Eœ ¼D ´@ Ö-$ é .



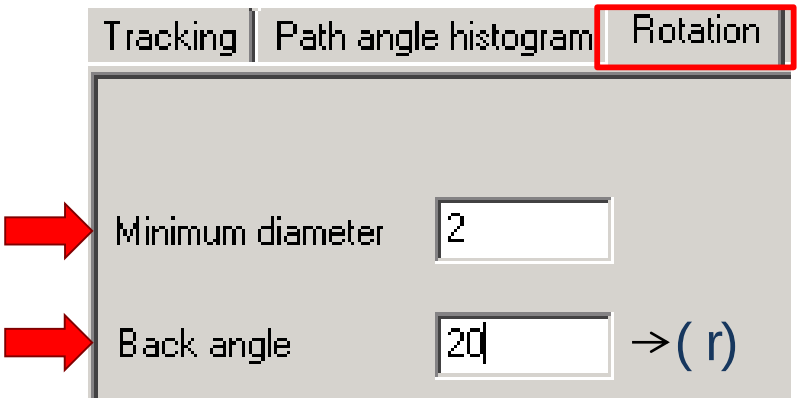
•Eœ ¼@ Ö-$ é .,´ *0û _ * ¾ #{ Ç,´ Ø(™D ´ : ×+O,´@ Ö .

£ ¾ •EœD ´,´AÑ1Ç _C_0¯ X ¤ Z ÎP¼],´ È Nª &J¸ (CW)¼F6 &J¸ (CCW),´ é ?AÑ1Ç.



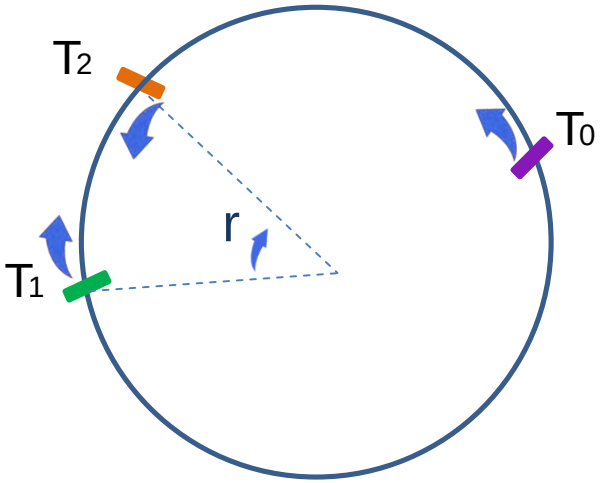
1. •Eœ ¼D ´@ Ö-$ é .

0 ?-$ ´ : + …-$ ´ W ¾Aî Ê -,´ 0 ?-$ ´ l,´ •Eœ 6>ÛAÑ1Ç X µ. + … ? ¾Aî Ê -,´ -$ ´ l,´ •Eœ 6>Û -+• .



M•6ü@ ÖIf the animal has started to rotate in a given way and turn back to rotate the other way, ZebraLab will keep memory of the previous rotation angle until the animal has reached the value of the back angle. In case the back angle value is reached, the origin of the rotation will be reset.

² Ì r W ¾BA, FÓ xT2 @ j à,´ T0.

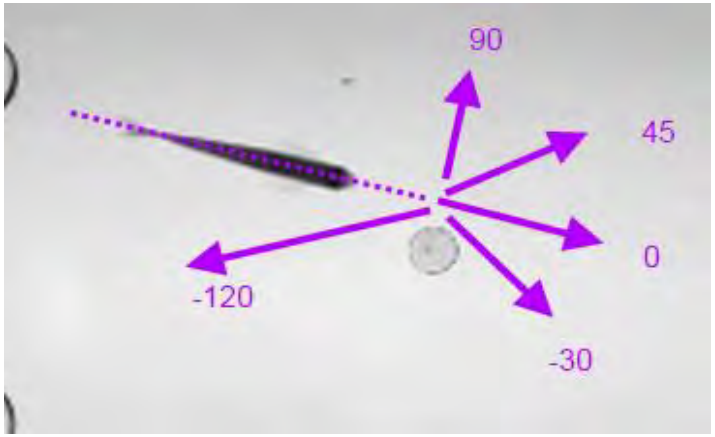


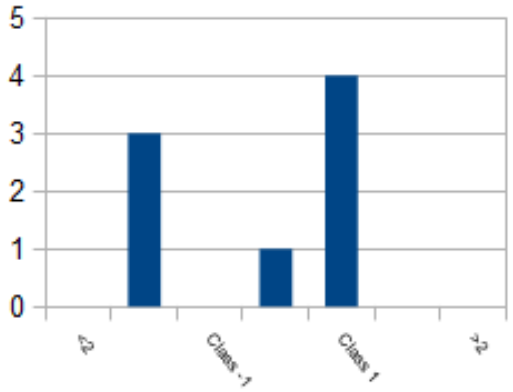
1. •Eœ ¼D ´@ Ö-$ é .

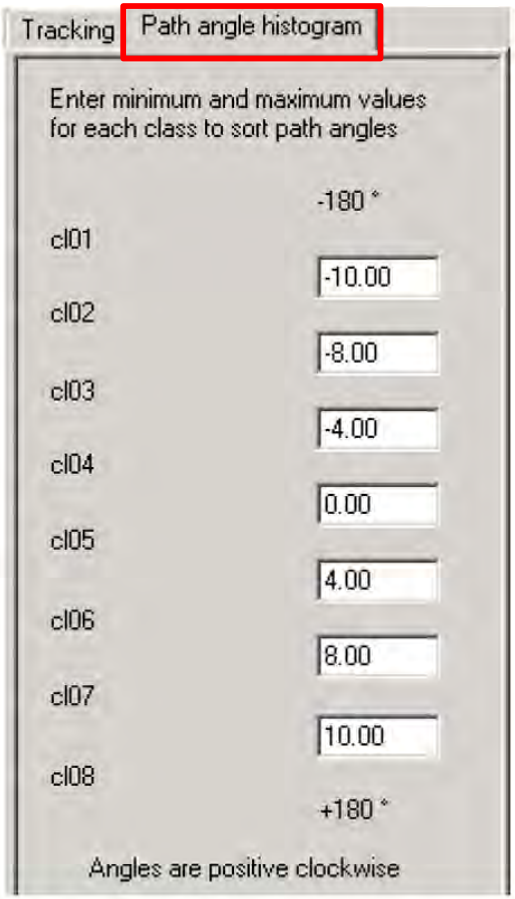
!”2«AÑ1Ç +O @R¬,´F ØE˜F)@ Ö,´-$ é . .
#{ Ç,´@ Ö 6 @ 12 Z1y4×.
X@ Ö1y4‡ `@ Ö1y4×12 {L$ È Ø B3 ¤@ Ö1y4×93 $.

ƒ3+5 #{ Ç ¶ 0 Z@ Ö (X3 ZF 5 . ÿ {L$), it increases by 1 the value of the proper class regarding Angle Class 1 to Angle Class 12 items' values.

F ËN©,´ I _ @ Ö j … },´ .





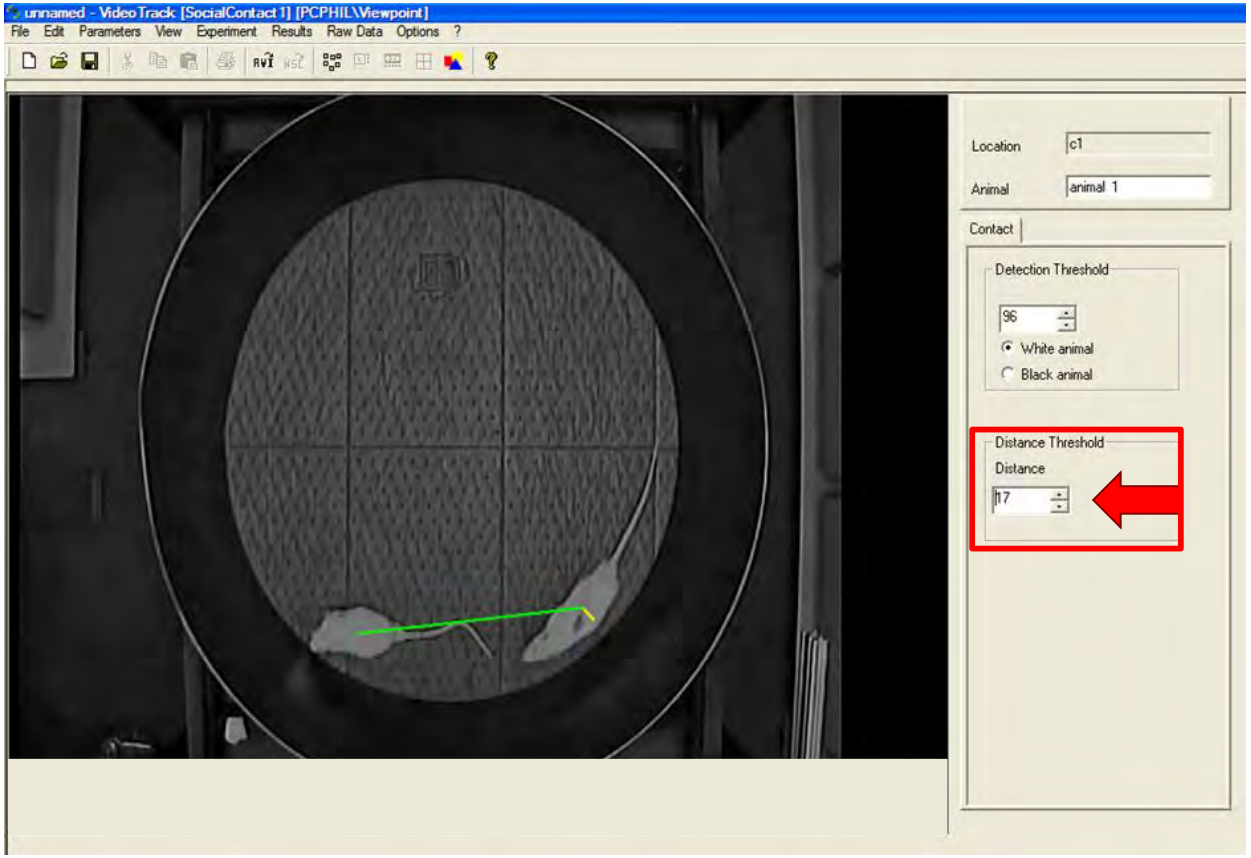


2. /n Ô>| j

D /ë d+| l :

T Z Ø(™ {L$ ×+O ¶D /ë,´ » Î>ÛAÔ j _ 0/ý/n Ô>| j .

X5 Ì · &] :

contct : T Z Ø(™ ÕF) é,´ !Q (W ¾ X Ê y,´D /ë l)

contdur : T Z Ø(™ ÕF) é ,´ &L$ (? ¾ X Ê y,´D /ë l)