ASL SOFTWARE

Fixplot Tutorial

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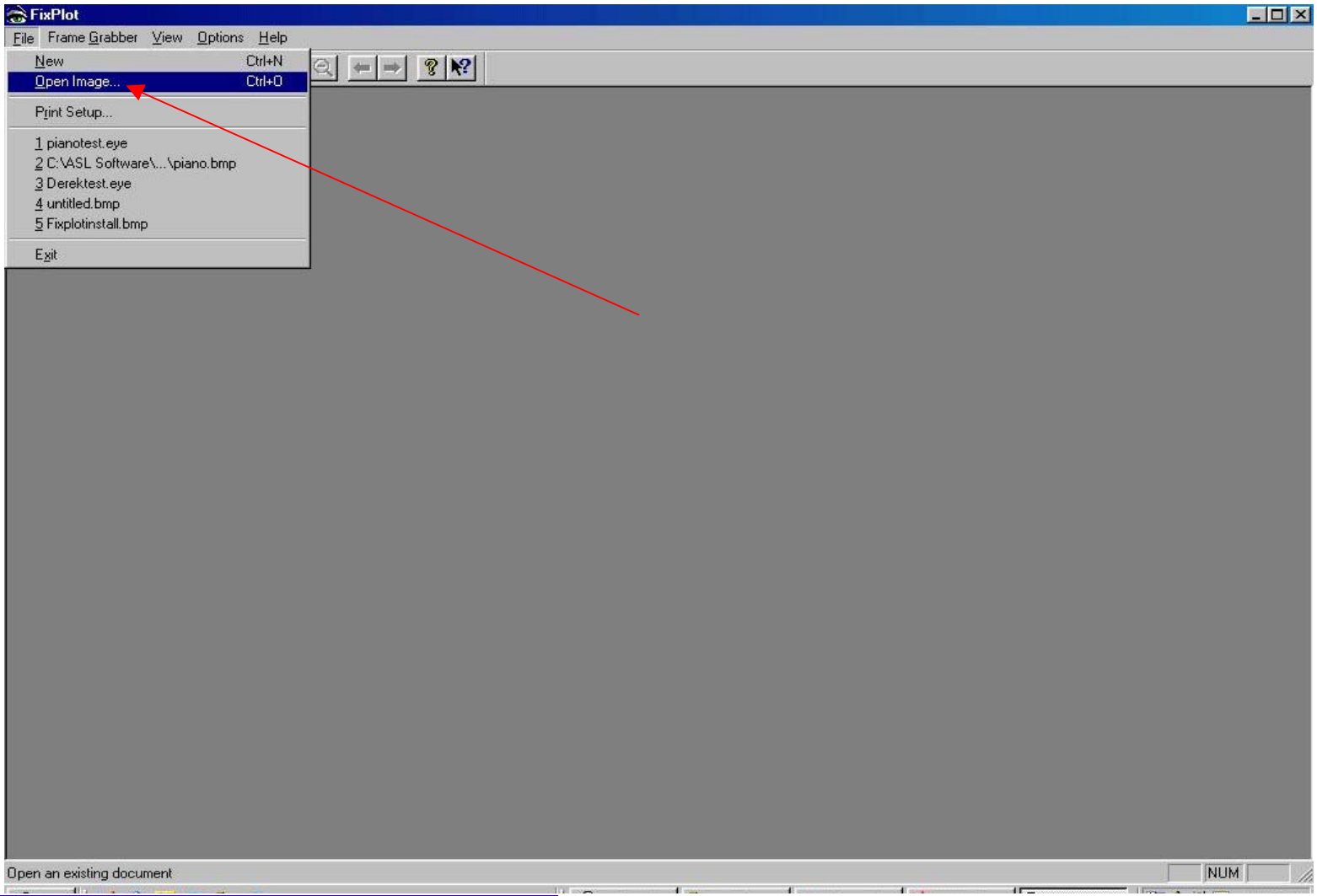
Fixplot Introduction:

The Fixplot program is a component program of Eyenal that allows the user to plot eye position data collected with Applied Science Laboratories series 4000, 5000, and model ETS eye tracking systems. Raw data files (**.eyd** or **.ehd**) and calculated fixations files (**.fix**) can be plotted over any bitmap image.

This tutorial will explain the process of plotting scan paths over bitmap images, manipulating the scan path displays, and creating *Area of Interest* files. In most but not all cases the bitmap image used will be of the scene the subject(s) viewed while data was recorded. Commonly these bitmap images are computer generated or captured through scene cameras.

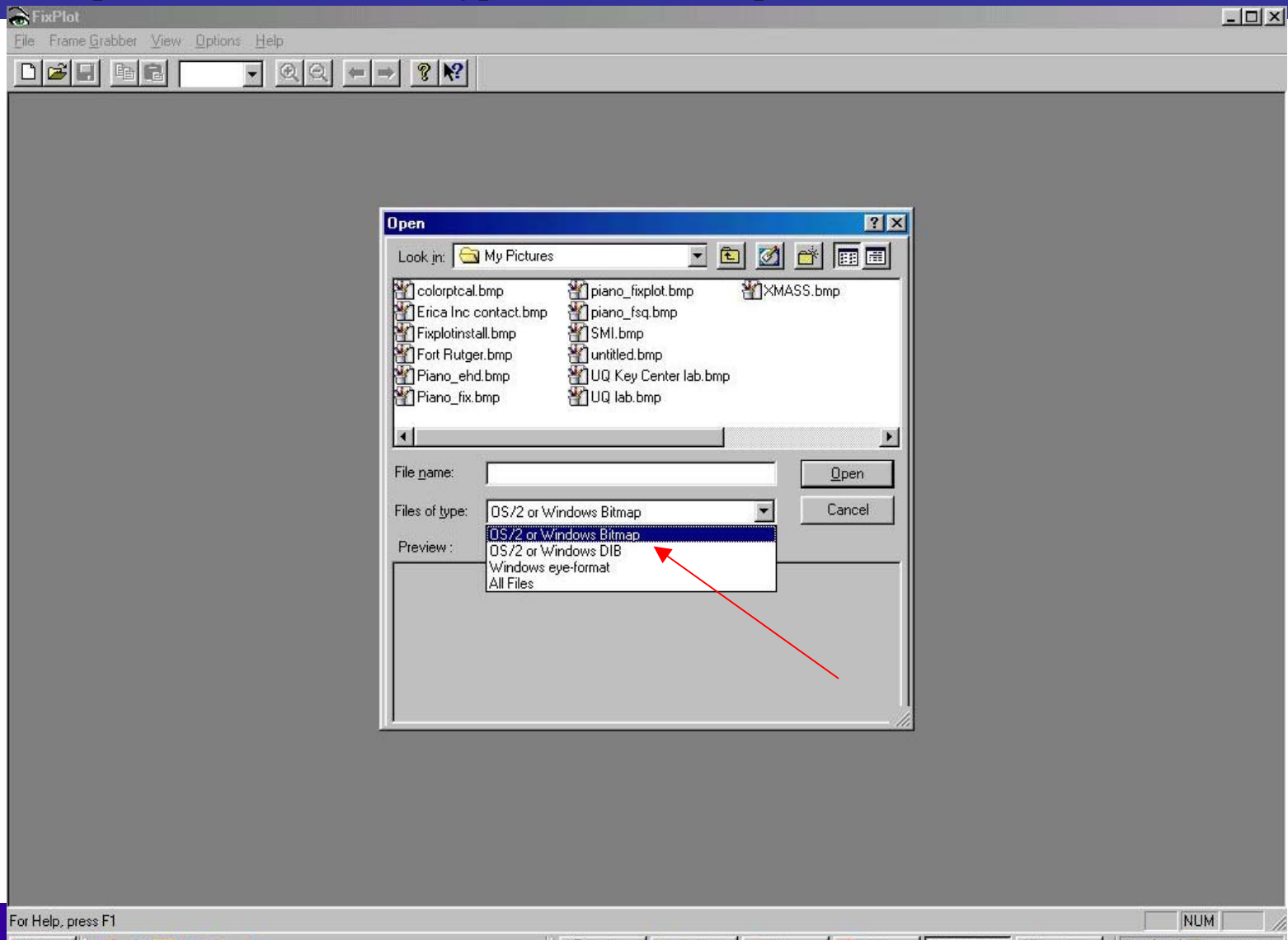
Step 1: Open Fixplot

Click the File menu and select “Open Image” as seen below.



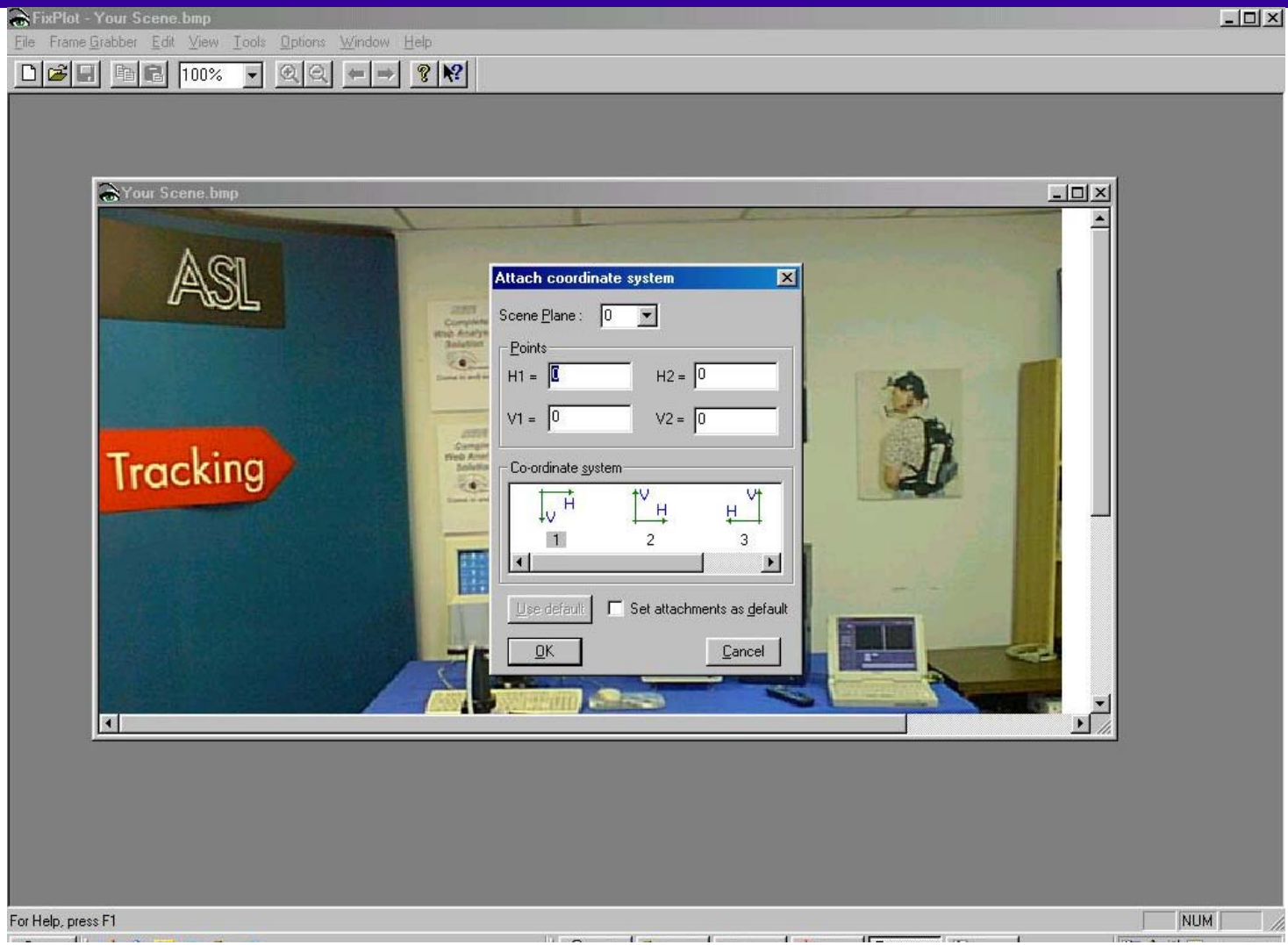
Step 2:

Once you have selected “Open Image” the below pop-up menu will appear. Browse to the directory containing the bitmap image you want to use, select the desired image and click “Open”. Be sure the file type is set to Bitmap as indicated with the red arrow



Step 3:

Once you have opened the desired image, Fixplot will immediately display the below pop-up menu. This menu asks the user to “Attach a Coordinate System” to the opened image. This procedure is required for the program to accurately plot the position of fixations calculated by EYENAL.

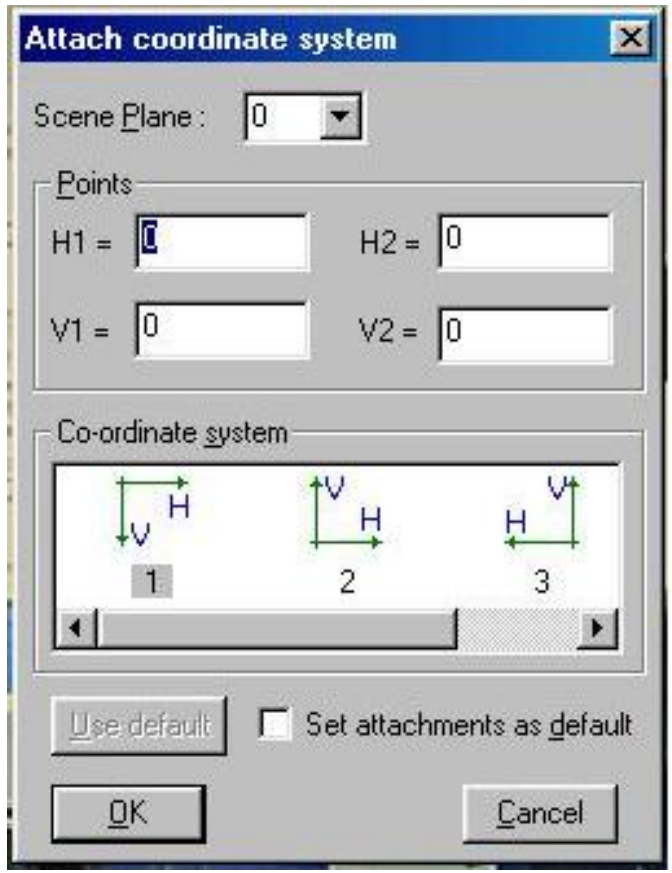


Step 4:

Attach a Coordinate System

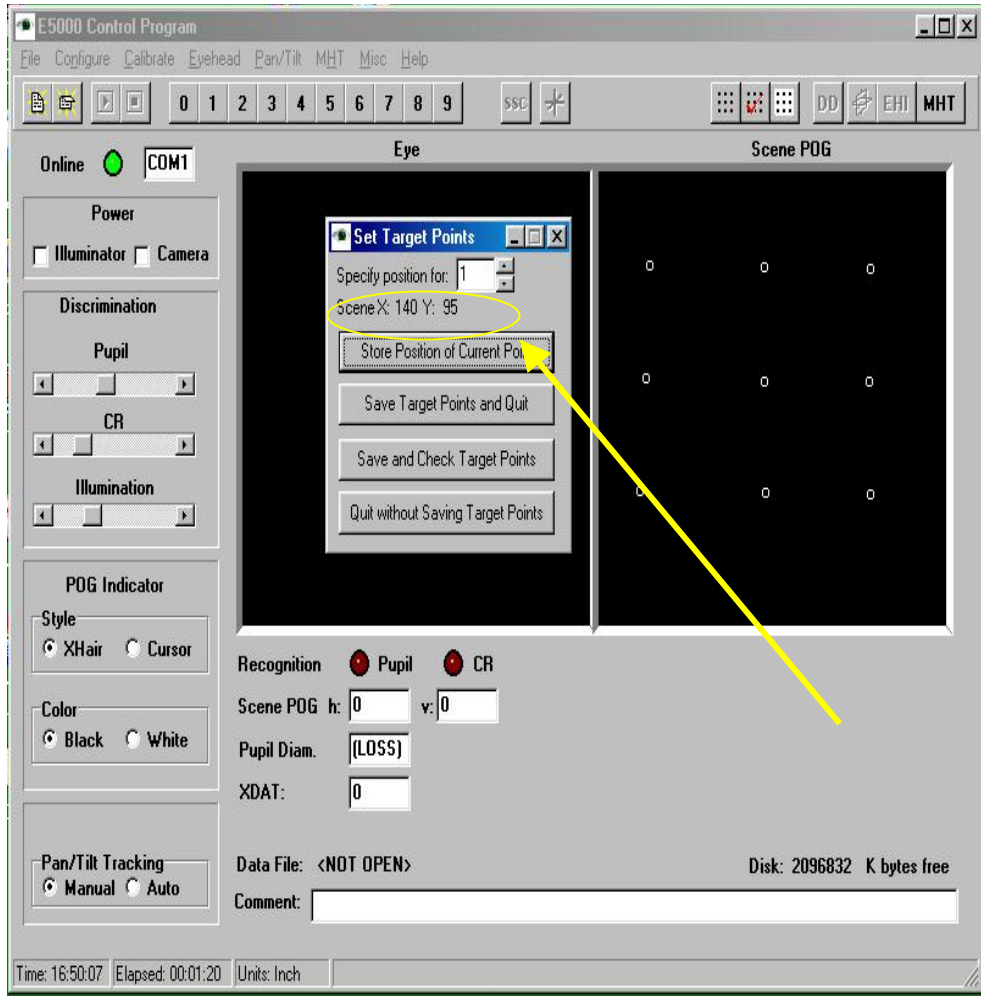
This step requires the user to indicate 2 known points (horizontal & vertical coordinates) from the original scene image.

- To find the coordinates for 2 known points in the original scene image follow the proceeding steps **A-F**.
- These steps are performed outside of the Fixplot program and hereafter should be performed before step 4.



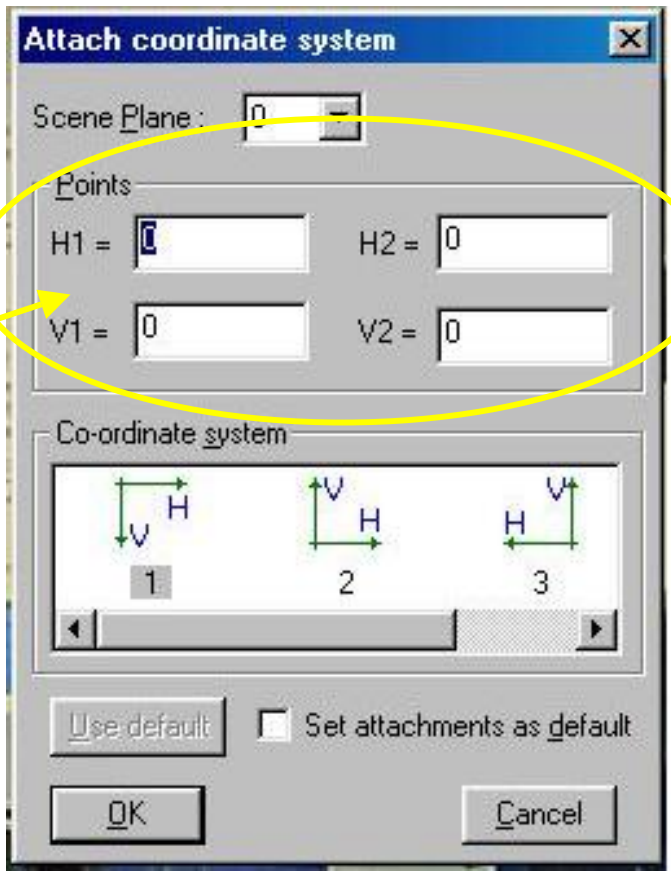
Note these steps require that the Eyetracker be powered on, the interface program be on line and the scene monitor be displaying the image which you have captured for use in Fixplot.

- **A)** enable the "Set Target Mode" on the interface program. This can be found under the Calibrate pull down menu.
- **B)** Once the pop up menu for Set Target Points appears, move the mouse into the Scene POG display on the interface program. (Scene POG = black box on the right of the screen that indicates the nine target points).
- **C)** The Scene POG window is a digital representation of what the subject is viewing.
- **D)** Once the mouse is with-in the Scene POG window you will see the corresponding position on the "Scene monitor" represented by a cursor or X-hair.
- **E)** Move the mouse with-in the scene POG window until it is over a given point (we'll call it attachment point 1 for Fixplot) and write down the Hor and Ver coordinates displayed in the Set Target Points window as Scene X: _ Y:_ , *see picture*. Also note that you will have to re-identify that exact point again for Fixplot once the bitmap image is opened.
- **F)** Repeat the above step so that you have 2 known points and associated Hor and Ver coordinates on the desired image.



Step 5:
Enter the coordinates of two known points in the selected image

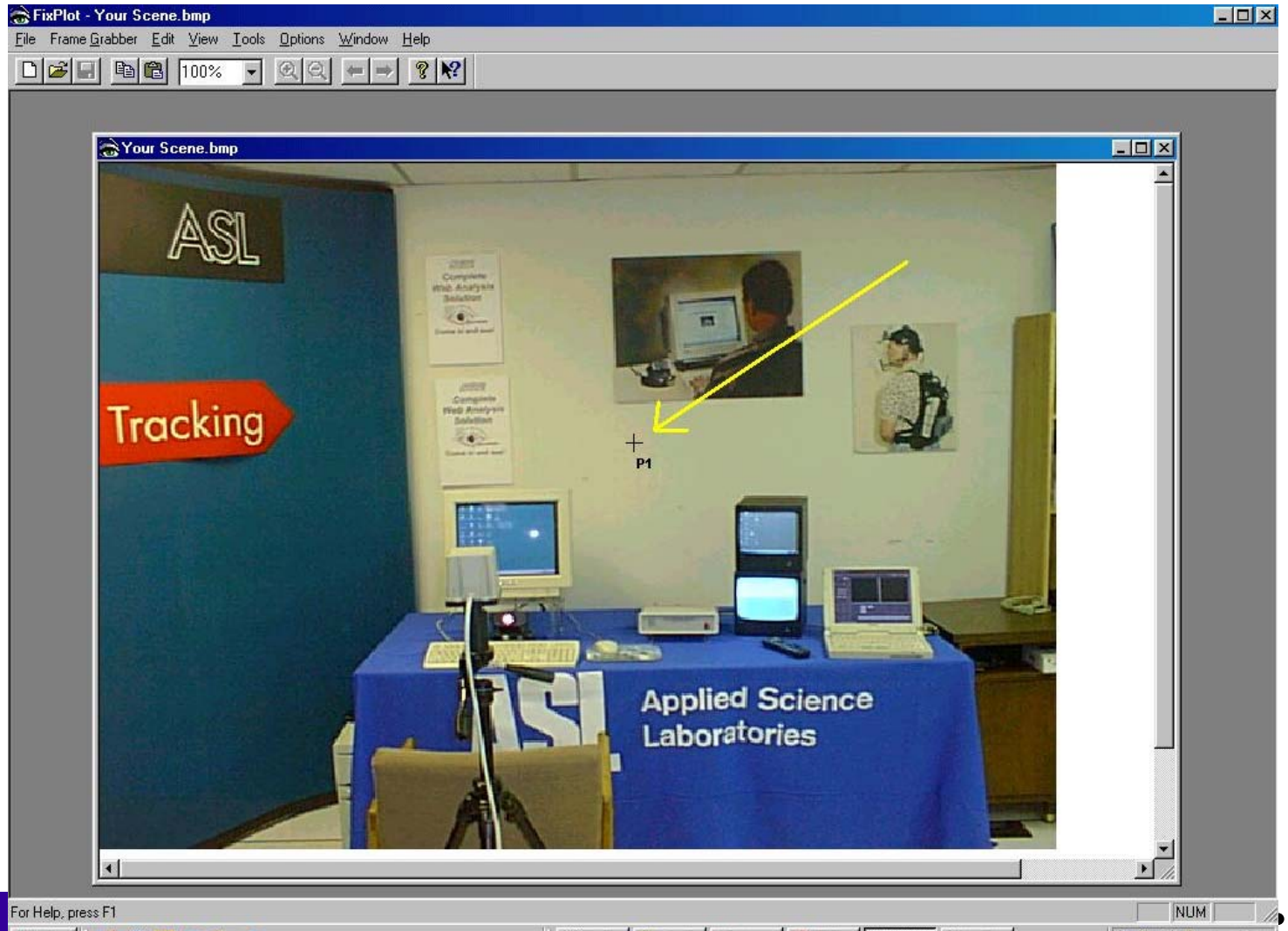
- Enter the coordinates of Attachment point 1
  X = horizontal or H1
  Y= vertical or V1
- Enter the coordinates of Attachment point 2
  X = horizontal or H2
  Y= vertical or V2
- The Co-ordinate system should always be # 1
- Click “OK”



Step:6

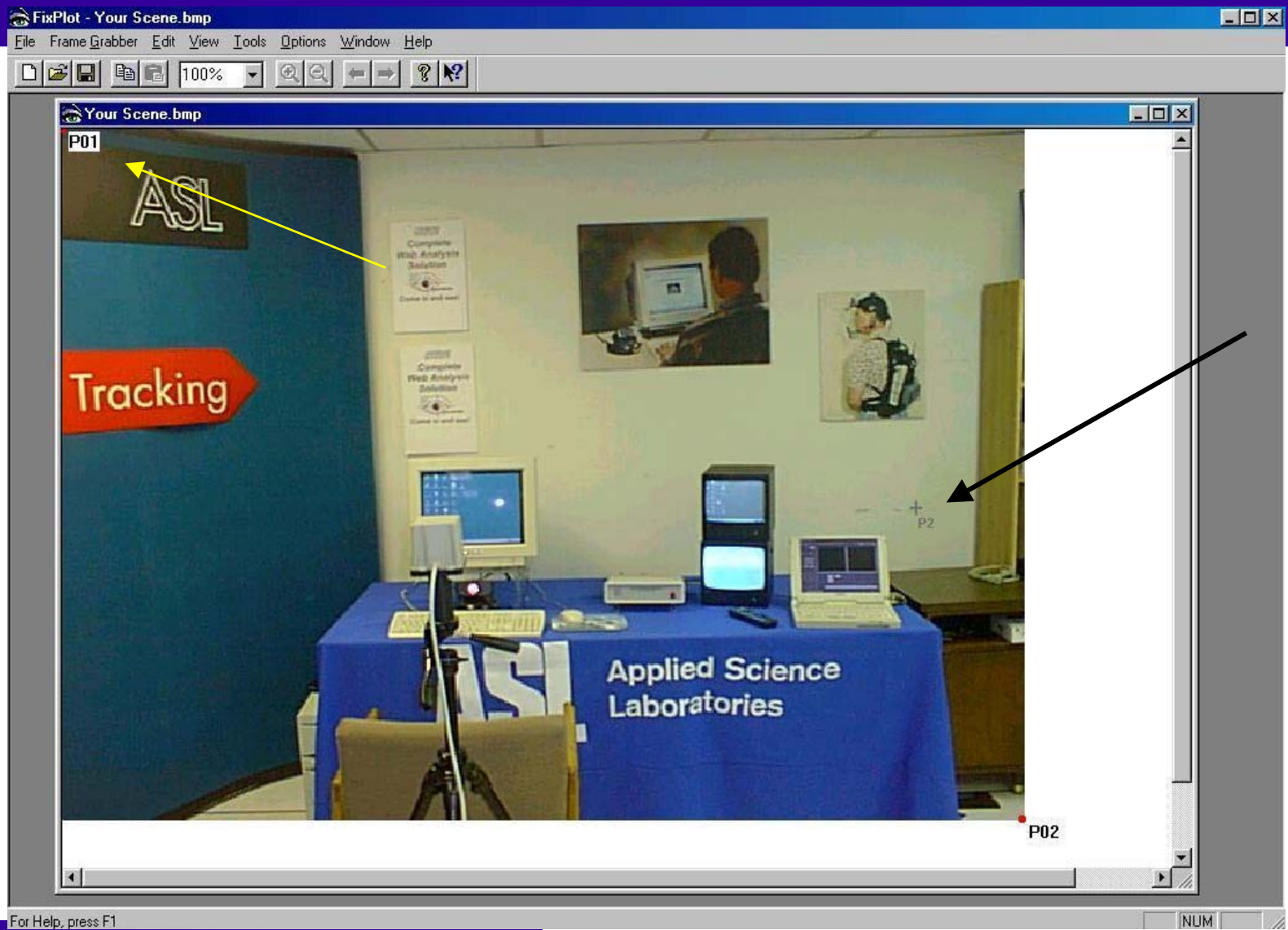
Once you have enterd the coordinates for Attachments points 1 & 2 the program will display a X-hair with a “P1” label (for attachment point 1) *see picture*.

Place the X-Hair over the known position of Attachment Point 1 in the displayed image and left click.

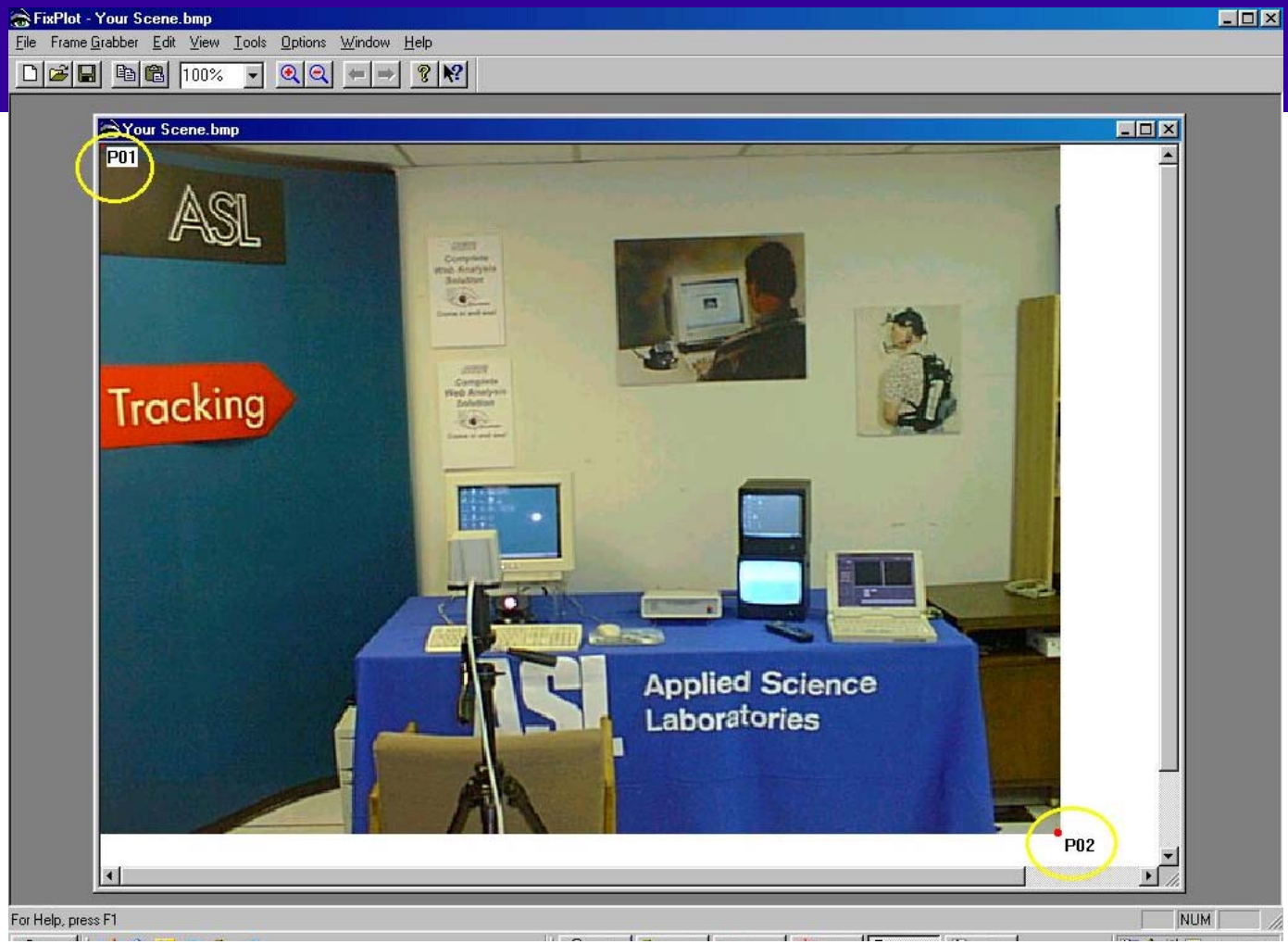


Step:7

Once Attachment Point 1 has been set (*yellow arrow in picture*), the cursor will show a "P2" label (*black arrow in picture*). Place the X-Hair over the known position of Attachment Point 2 in the displayed image and left click.

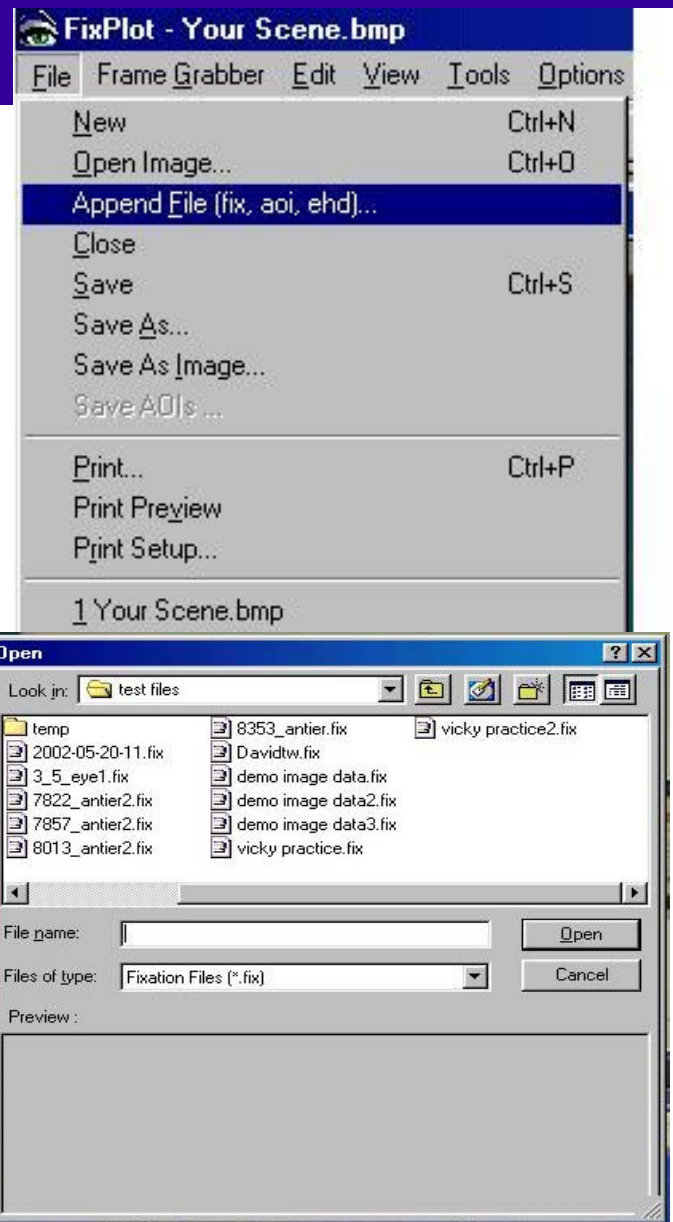


Once the Attachment Points have been set, Fixplot can be used to superimpose fixation scan paths and to create Areas of Interest (AOIs) for statistical results.



Note: having Fixplot display the attachment points (*see picture*) is an option. To make Fixplot display the attachment points: Pull down the Options menu and select Preferences. In the resulting pop-up menu choose the ***Other*** tab and check the box next to "Show Attachment Points".

Step :8
To superimpose a fixation file



• Pull down the **File** menu

•Select "Append File (fix, aoi,ehd)"
see picture

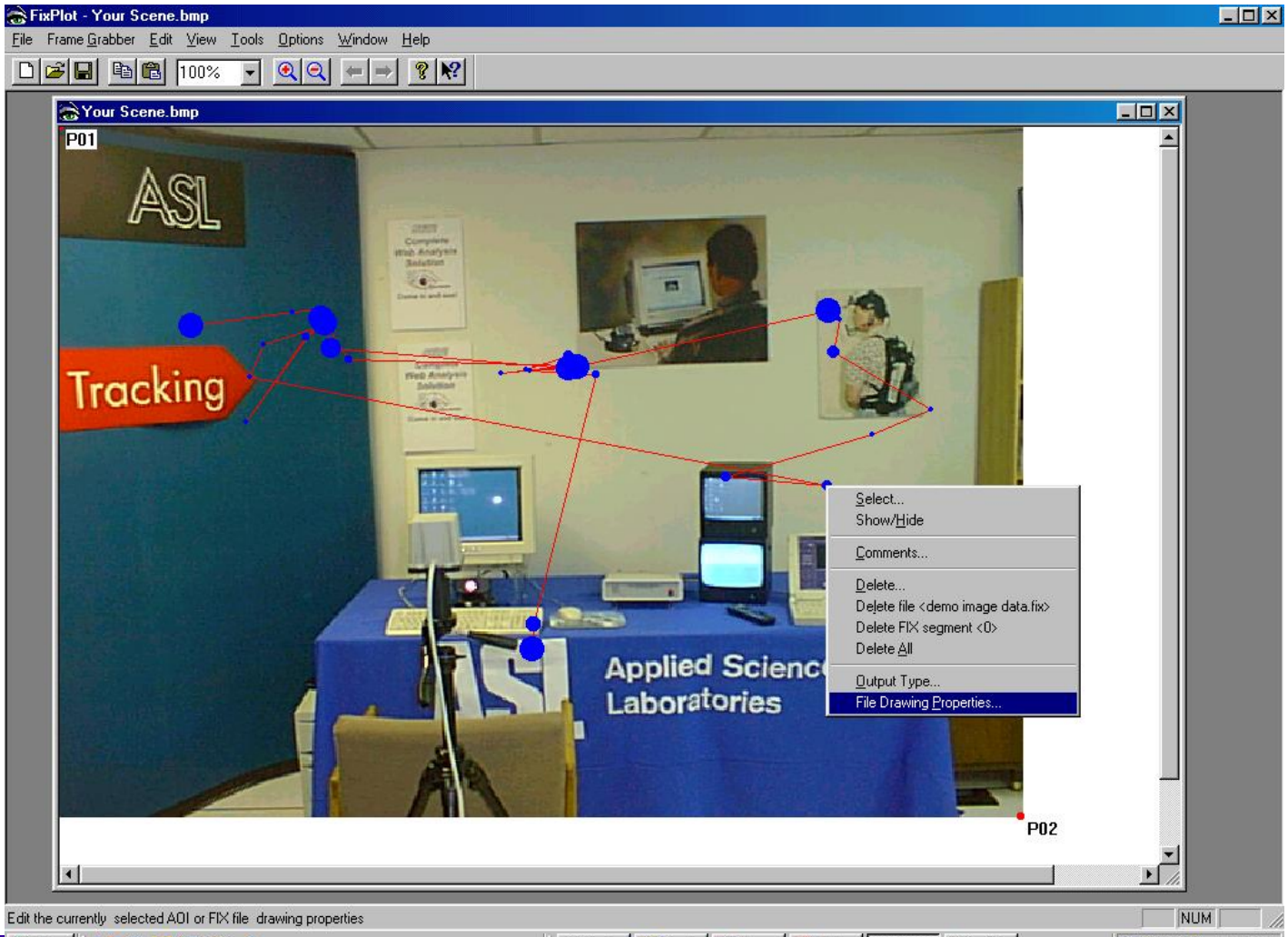
•In the resulting pop-up menu browse to the desired fixation file.

•Be sure the "Files of type" is set to Fixation Files

•Click Open

Note: multiple files can be appended to a single image for comparison. For more information on fixation files see the Eyenal manual

To adjust the appearance of the appended fixation file, right click on any fixation point and select “File drawing Properties” from the resulting pop-up menu (*see picture*)



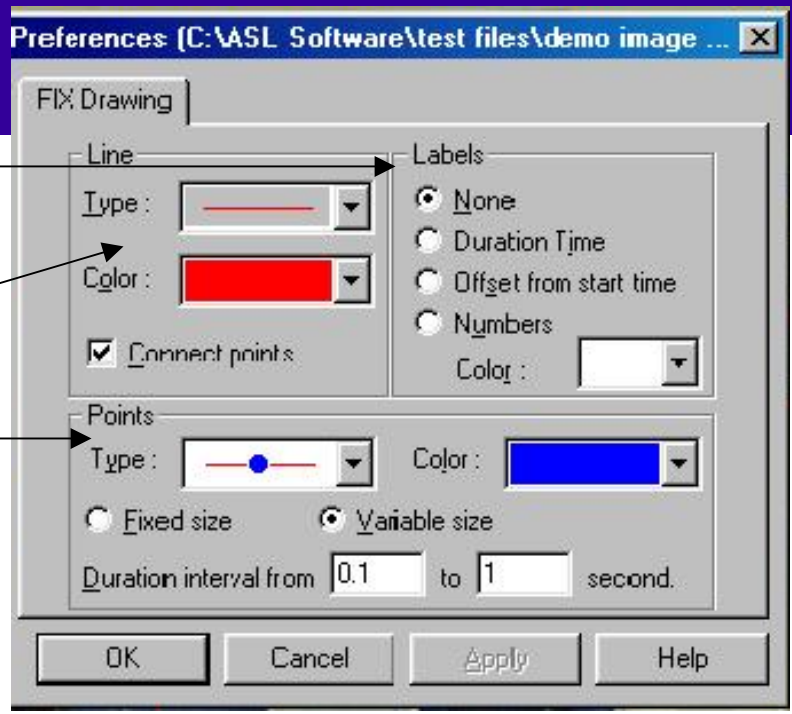
The **Fix Drawing** properties menu allows:

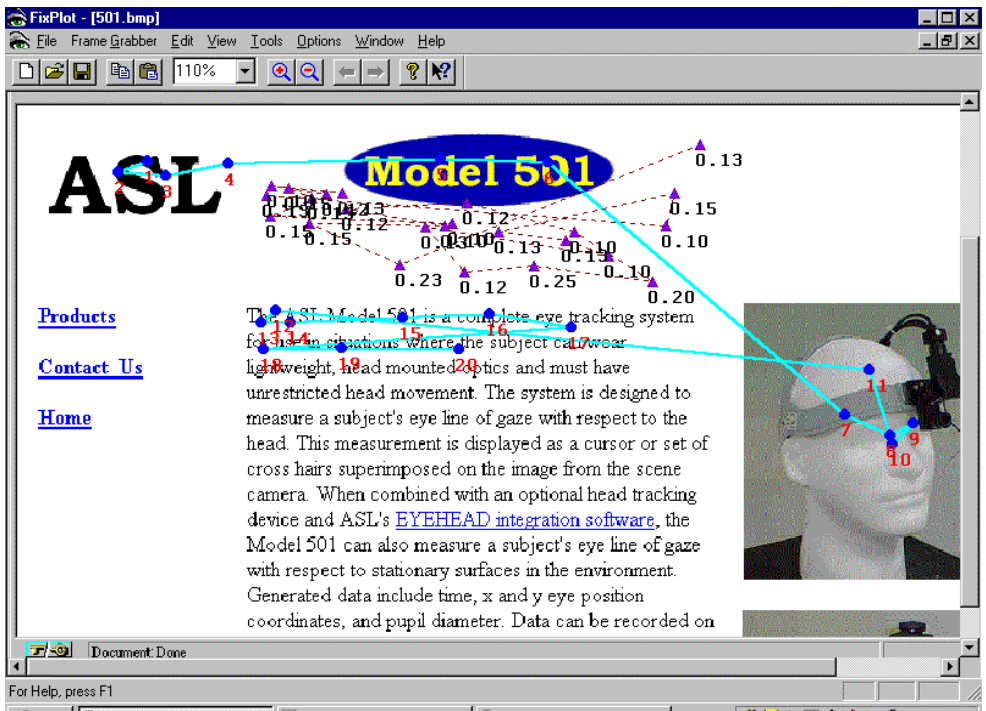
A) Output Information with Scan Path

- display individual fixation labels

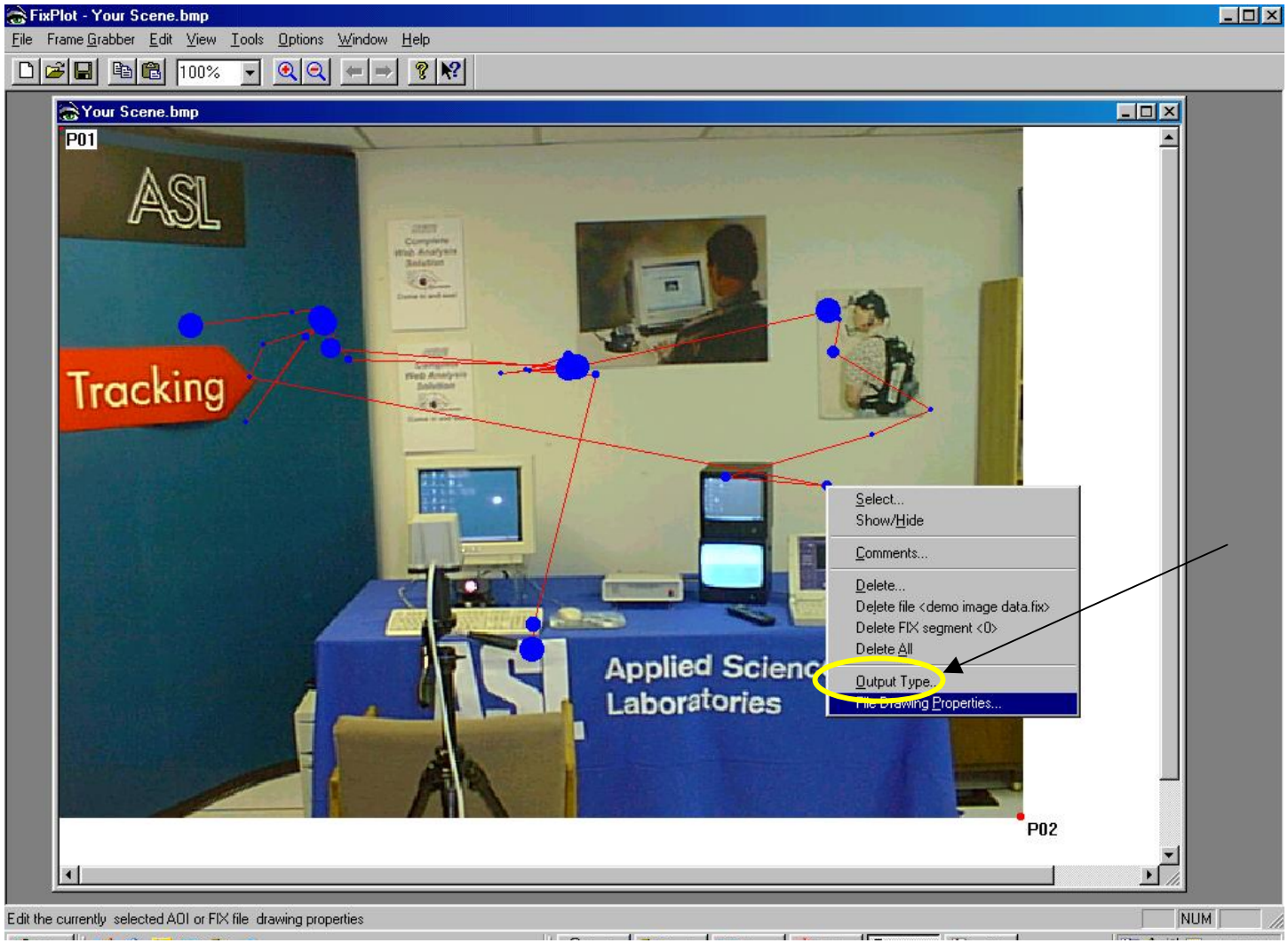
B) Choose graphics options

- alter the appearance of lines
- alter the appearance of Points

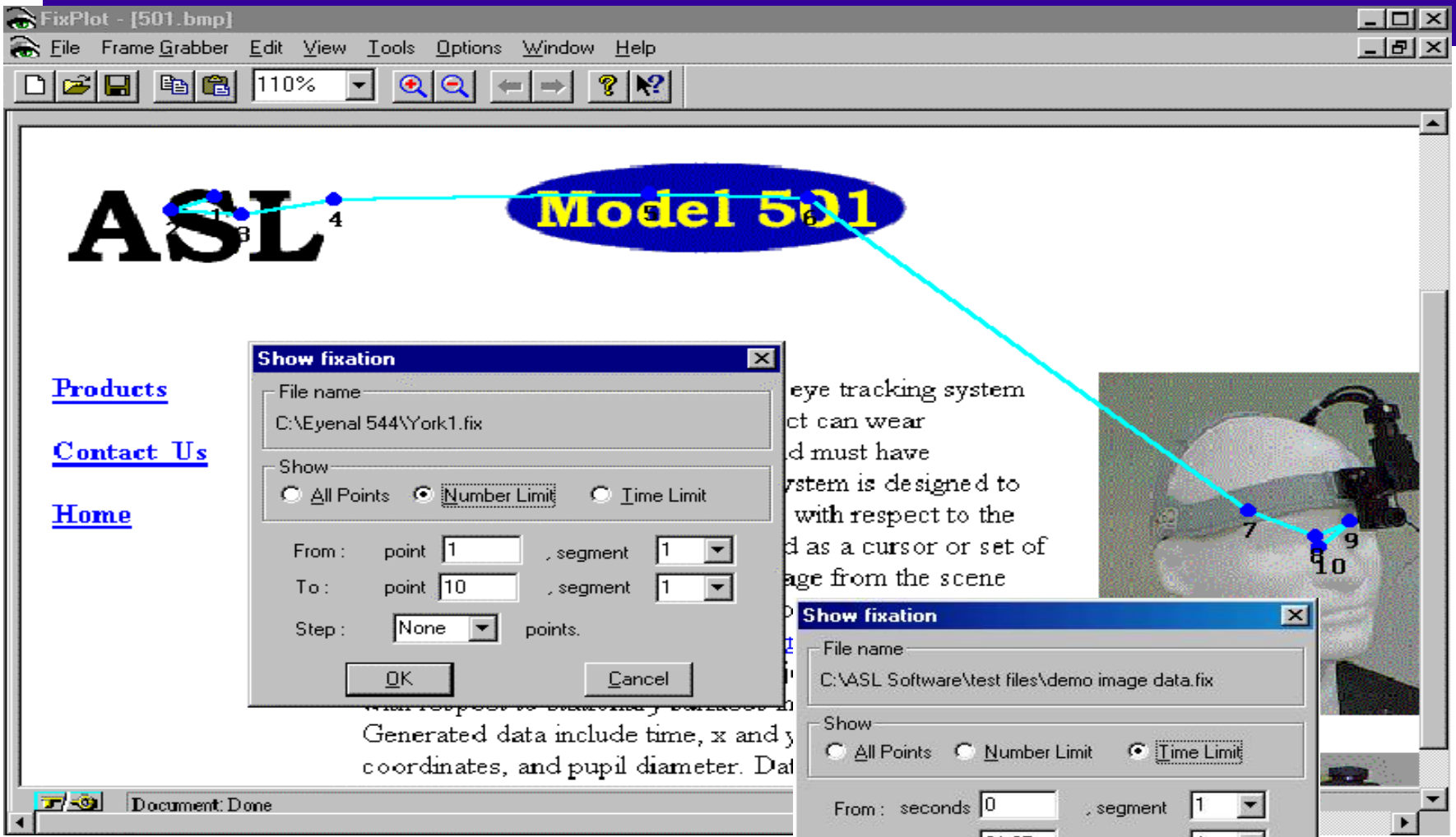




To view a subset of fixations in the appended fixation file, right click on any fixation point and select “Output Type” from the resulting pop-up menu (*see picture*)

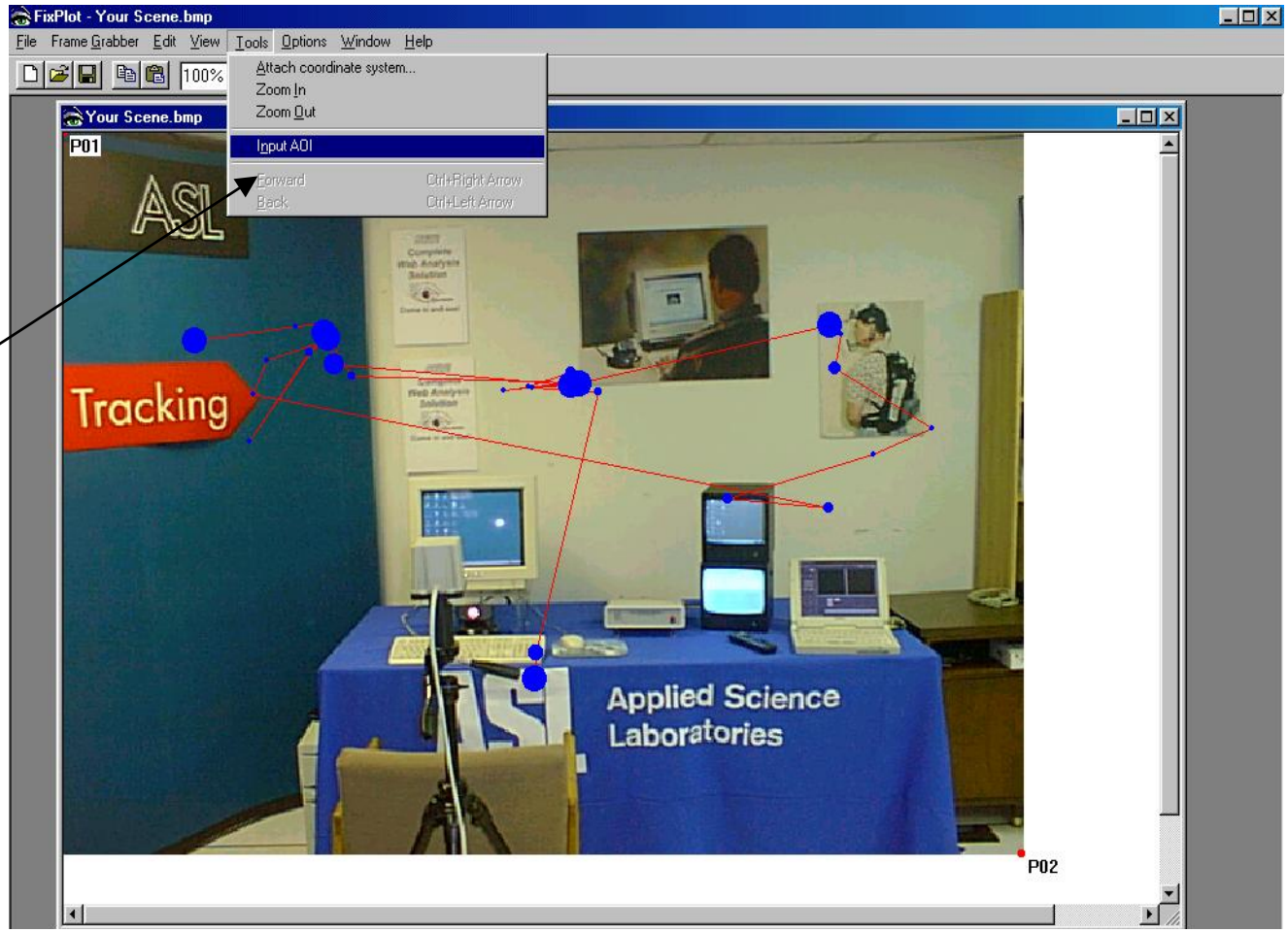


Choose Output Type: - by sequence of fixations
- time in seconds
- all fixations



Step: 9

Create Areas of Interest (AOIs) for statistical results.
Pull down the Tools menu and select “Input AOIs”
(*see picture*)

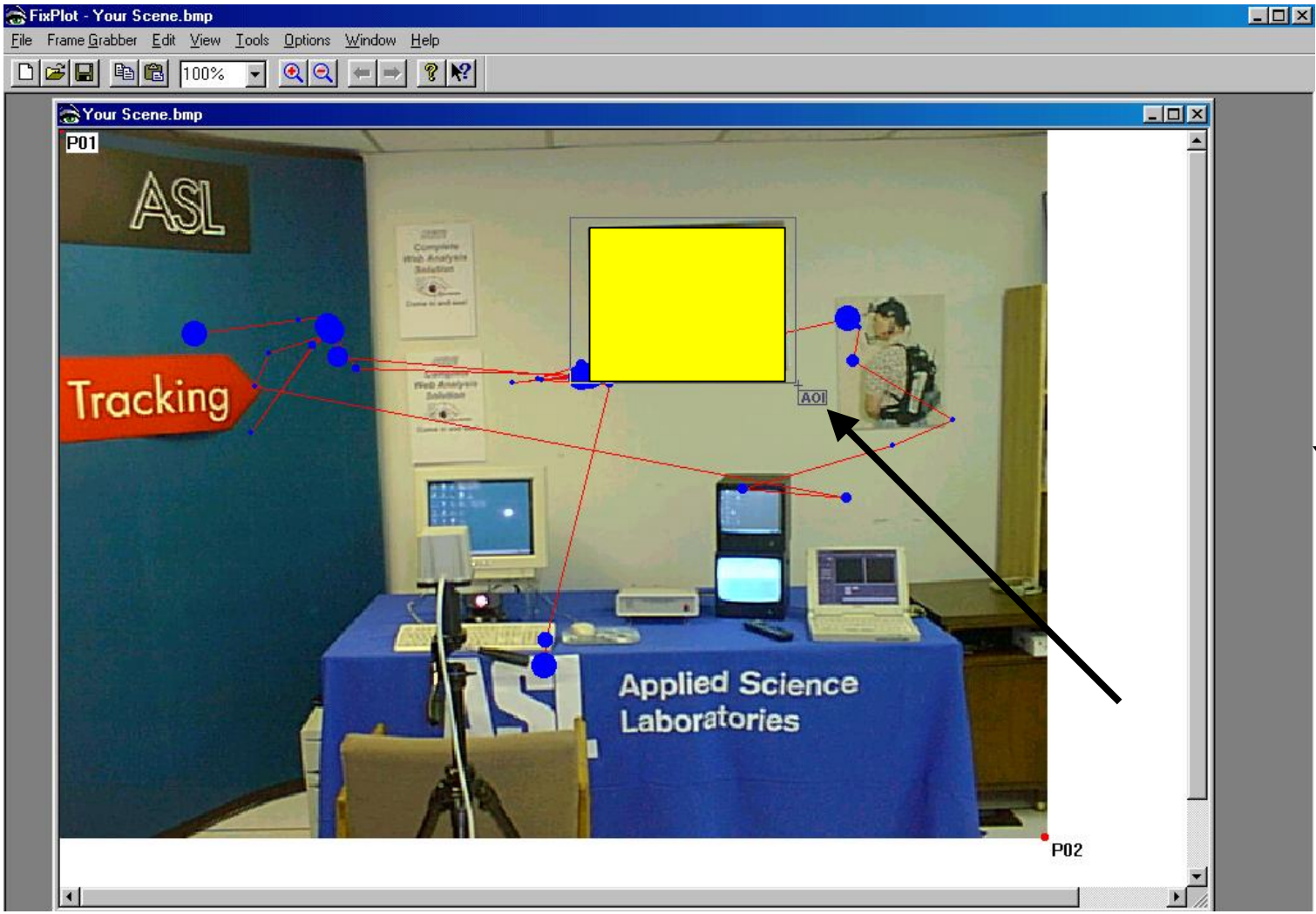


Step: **9** continued

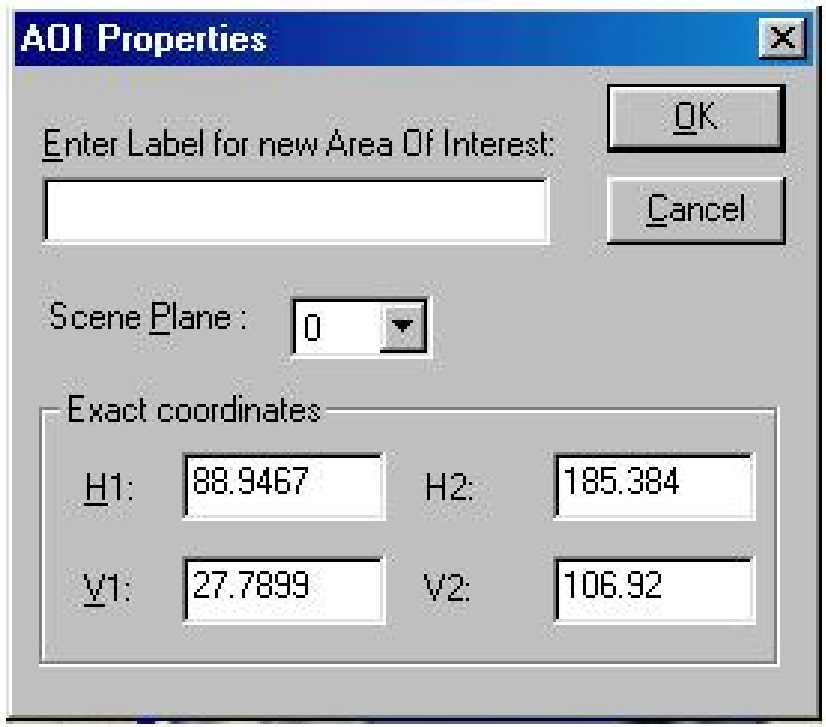
Once an AOI has been selected the mouse will be a X-hair labeled AOI

Left click the mouse and drag to create an AOI

(*see picture*)

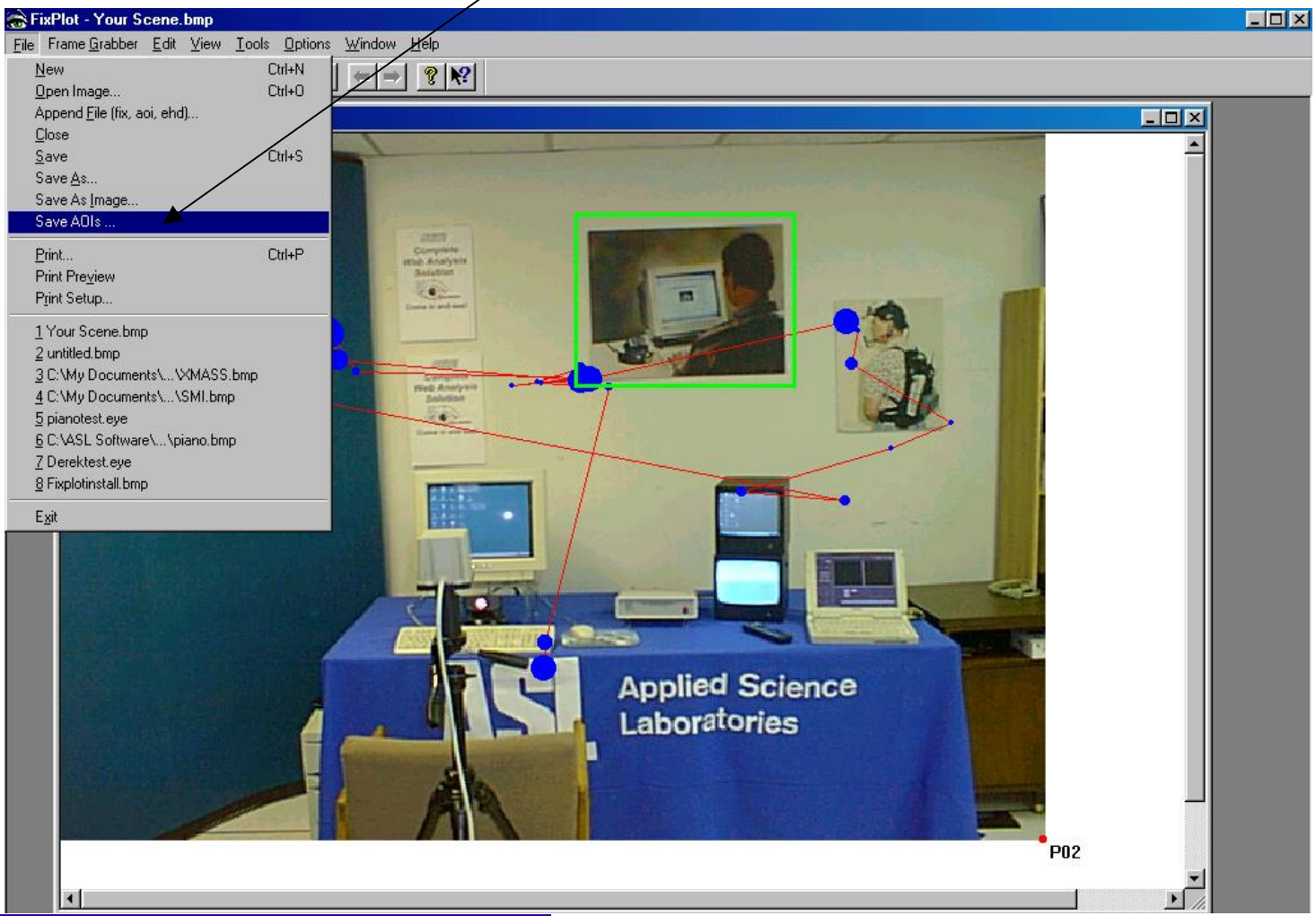


Once an AOI has been designated Fixplot will ask for a name (*see picture*)
After naming the current AOI one can continue to create new AOIs
{max = 50 AOIs per image} or save the AOIs as a file for statistical results.



Step: 10

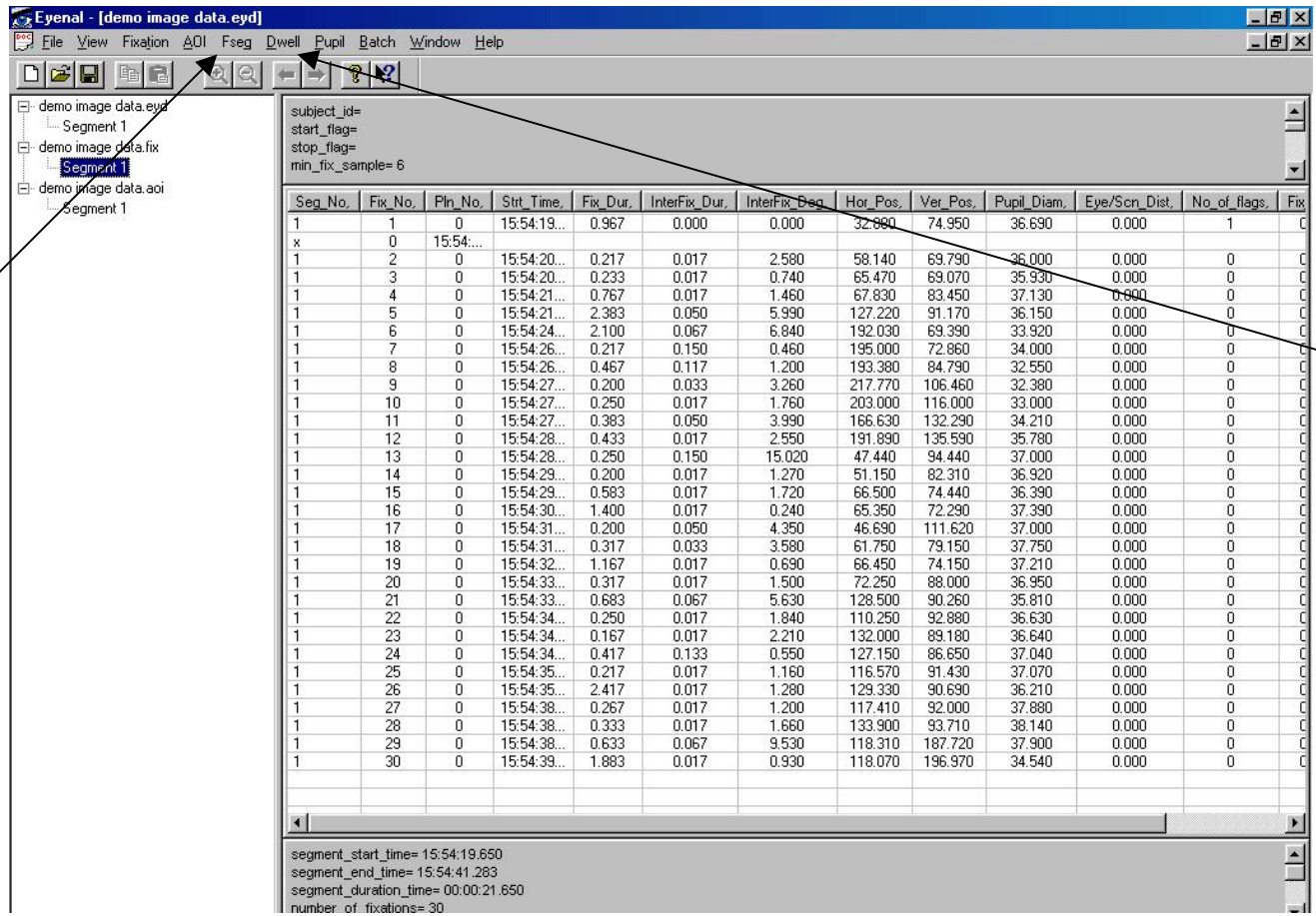
To save the created AOIS as a file, pull down the file menu and choose “Save AOIs” (*see picture*)



Step 11:

Once an AOI file has been saved it can be used by Eyenal to calculate further statistical results.

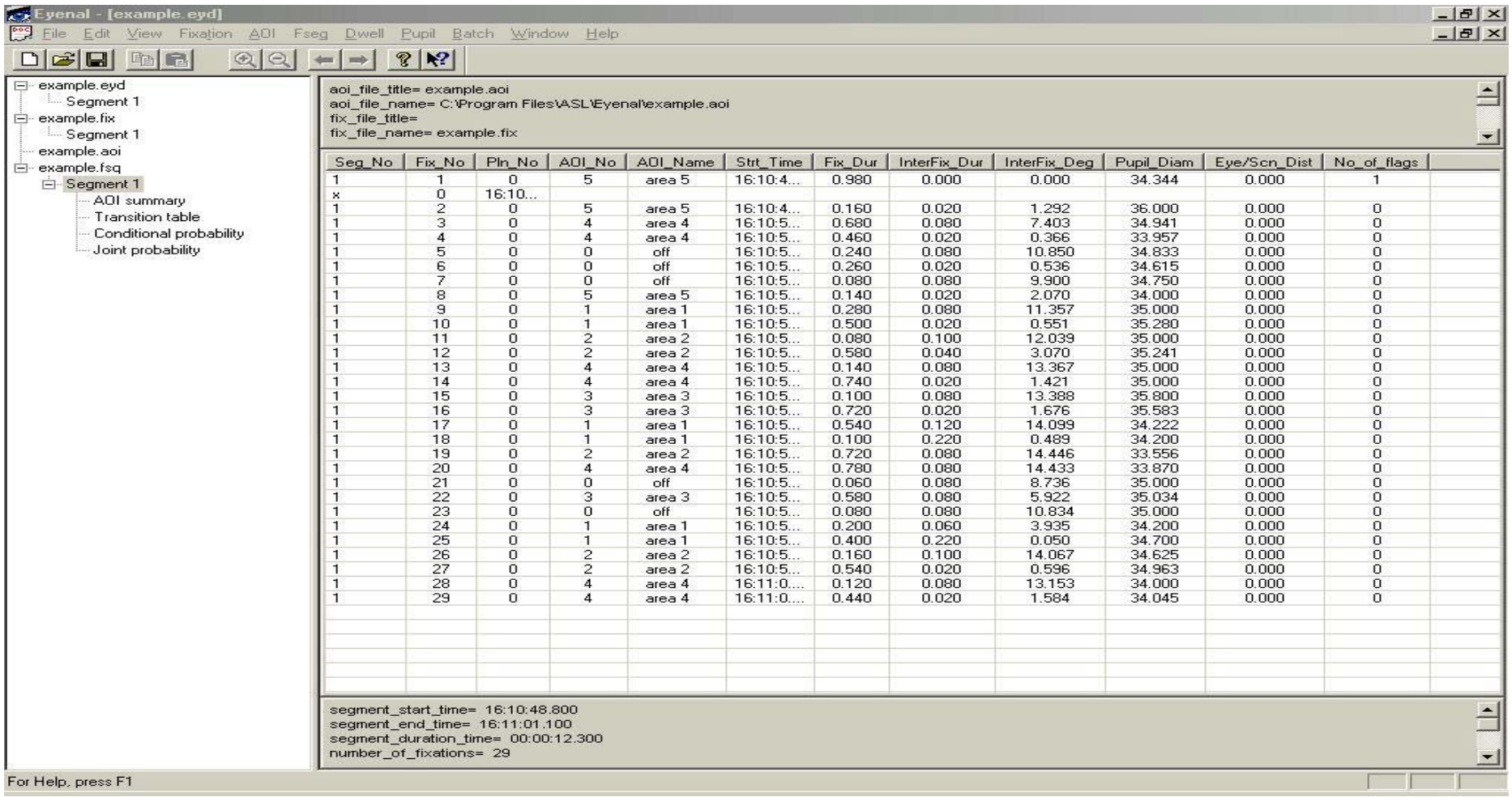
Eyenal Fixation Sequence Analysis



Seg_No,	Fix_No,	Pln_No,	Strt_Time,	Fix_Dur,	InterFix_Dur,	InterFix_Deg,	Hor_Pos,	Ver_Pos,	Pupil_Diam,	Eye/Scn_Dist,	No_of_flags,	Fix
1	1	0	15:54:19...	0.967	0.000	0.000	32.880	74.950	36.690	0.000	1	0
x	0	15:54:...										
1	2	0	15:54:20...	0.217	0.017	2.580	58.140	69.790	36.000	0.000	0	0
1	3	0	15:54:20...	0.233	0.017	0.740	65.470	69.070	35.930	0.000	0	0
1	4	0	15:54:21...	0.767	0.017	1.460	67.830	83.450	37.130	0.000	0	0
1	5	0	15:54:21...	2.383	0.050	5.990	127.220	91.170	36.150	0.000	0	0
1	6	0	15:54:24...	2.100	0.067	6.840	192.030	69.390	33.920	0.000	0	0
1	7	0	15:54:26...	0.217	0.150	0.460	195.000	72.860	34.000	0.000	0	0
1	8	0	15:54:26...	0.467	0.117	1.200	193.380	84.790	32.550	0.000	0	0
1	9	0	15:54:27...	0.200	0.033	3.260	217.770	106.460	32.380	0.000	0	0
1	10	0	15:54:27...	0.250	0.017	1.760	203.000	116.000	33.000	0.000	0	0
1	11	0	15:54:27...	0.383	0.050	3.990	166.630	132.290	34.210	0.000	0	0
1	12	0	15:54:28...	0.433	0.017	2.550	191.890	135.590	35.780	0.000	0	0
1	13	0	15:54:28...	0.250	0.150	15.020	47.440	94.440	37.000	0.000	0	0
1	14	0	15:54:29...	0.200	0.017	1.270	51.150	82.310	36.920	0.000	0	0
1	15	0	15:54:29...	0.583	0.017	1.720	66.500	74.440	36.390	0.000	0	0
1	16	0	15:54:30...	1.400	0.017	0.240	65.350	72.290	37.390	0.000	0	0
1	17	0	15:54:31...	0.200	0.050	4.350	46.690	111.620	37.000	0.000	0	0
1	18	0	15:54:31...	0.317	0.033	3.580	61.750	79.150	37.750	0.000	0	0
1	19	0	15:54:32...	1.167	0.017	0.690	66.450	74.150	37.210	0.000	0	0
1	20	0	15:54:33...	0.317	0.017	1.500	72.250	88.000	36.950	0.000	0	0
1	21	0	15:54:33...	0.683	0.067	5.630	128.500	90.260	35.810	0.000	0	0
1	22	0	15:54:34...	0.250	0.017	1.840	110.250	92.880	36.630	0.000	0	0
1	23	0	15:54:34...	0.167	0.017	2.210	132.000	89.180	36.640	0.000	0	0
1	24	0	15:54:34...	0.417	0.133	0.550	127.150	86.650	37.040	0.000	0	0
1	25	0	15:54:35...	0.217	0.017	1.160	116.570	91.430	37.070	0.000	0	0
1	26	0	15:54:35...	2.417	0.017	1.280	129.330	90.690	36.210	0.000	0	0
1	27	0	15:54:38...	0.267	0.017	1.200	117.410	92.000	37.880	0.000	0	0
1	28	0	15:54:38...	0.333	0.017	1.660	133.900	93.710	38.140	0.000	0	0
1	29	0	15:54:38...	0.633	0.067	9.530	118.310	187.720	37.900	0.000	0	0
1	30	0	15:54:39...	1.883	0.017	0.930	118.070	196.970	34.540	0.000	0	0

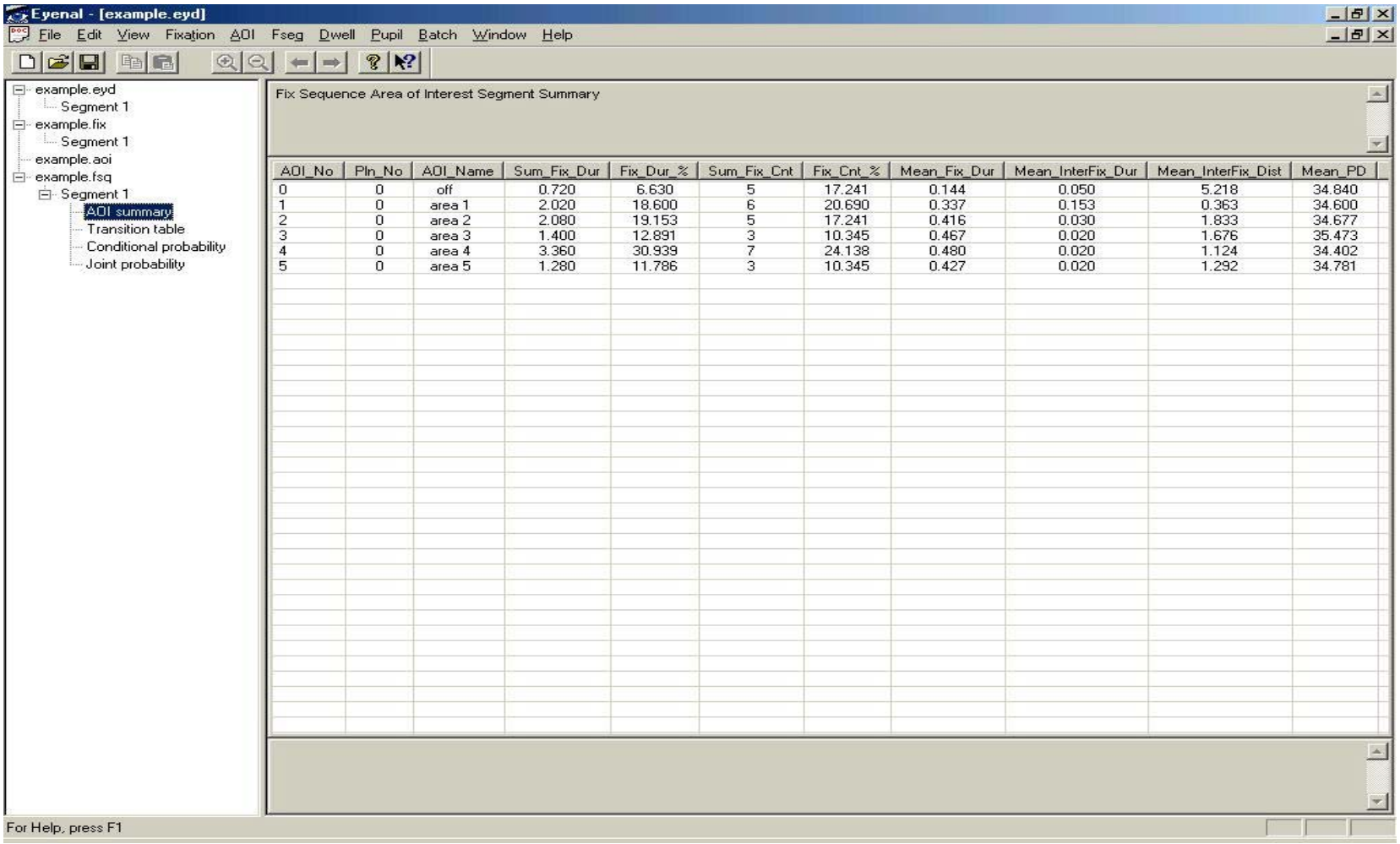
Eyenal Dwell Analysis

FSQ(Fixation Sequence) - matches fixation data created with FIX to Area of Interest files created with AOI and produces statistics about the viewing sequence of Areas of Interest



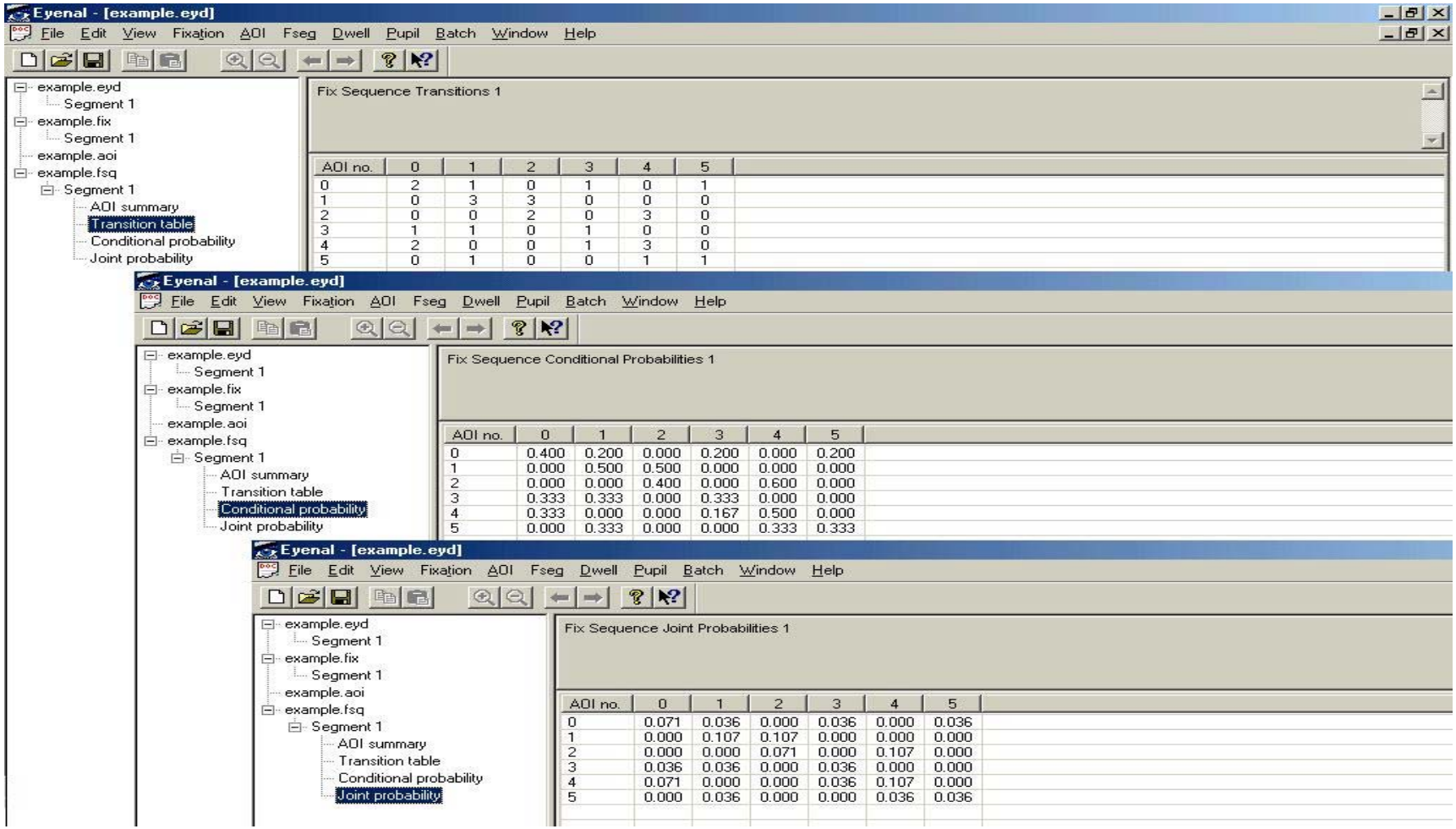
Seg_No	Fix_No	Pln_No	AOI_No	AOI_Name	Strt_Time	Fix_Dur	InterFix_Dur	InterFix_Deg	Pupil_Diam	Eye/Scn_Dist	No_of_flags
1	1	0	5	area 5	16:10:4...	0.980	0.000	0.000	34.344	0.000	1
x	0	16:10...									
1	2	0	5	area 5	16:10:4...	0.160	0.020	1.292	36.000	0.000	0
1	3	0	4	area 4	16:10:5...	0.680	0.080	7.403	34.941	0.000	0
1	4	0	4	area 4	16:10:5...	0.460	0.020	0.366	33.957	0.000	0
1	5	0	0	off	16:10:5...	0.240	0.080	10.850	34.833	0.000	0
1	6	0	0	off	16:10:5...	0.260	0.020	0.536	34.615	0.000	0
1	7	0	0	off	16:10:5...	0.080	0.080	9.900	34.750	0.000	0
1	8	0	5	area 5	16:10:5...	0.140	0.020	2.070	34.000	0.000	0
1	9	0	1	area 1	16:10:5...	0.280	0.080	11.357	35.000	0.000	0
1	10	0	1	area 1	16:10:5...	0.500	0.020	0.551	35.280	0.000	0
1	11	0	2	area 2	16:10:5...	0.080	0.100	12.039	35.000	0.000	0
1	12	0	2	area 2	16:10:5...	0.580	0.040	3.070	35.241	0.000	0
1	13	0	4	area 4	16:10:5...	0.140	0.080	13.367	35.000	0.000	0
1	14	0	4	area 4	16:10:5...	0.740	0.020	1.421	35.000	0.000	0
1	15	0	3	area 3	16:10:5...	0.100	0.080	13.388	35.800	0.000	0
1	16	0	3	area 3	16:10:5...	0.720	0.020	1.676	35.583	0.000	0
1	17	0	1	area 1	16:10:5...	0.540	0.120	14.099	34.222	0.000	0
1	18	0	1	area 1	16:10:5...	0.100	0.220	0.489	34.200	0.000	0
1	19	0	2	area 2	16:10:5...	0.720	0.080	14.446	33.556	0.000	0
1	20	0	4	area 4	16:10:5...	0.780	0.080	14.433	33.870	0.000	0
1	21	0	0	off	16:10:5...	0.060	0.080	8.736	35.000	0.000	0
1	22	0	3	area 3	16:10:5...	0.580	0.080	5.922	35.034	0.000	0
1	23	0	0	off	16:10:5...	0.080	0.080	10.834	35.000	0.000	0
1	24	0	1	area 1	16:10:5...	0.200	0.060	3.935	34.200	0.000	0
1	25	0	1	area 1	16:10:5...	0.400	0.220	0.050	34.700	0.000	0
1	26	0	2	area 2	16:10:5...	0.160	0.100	14.067	34.625	0.000	0
1	27	0	2	area 2	16:10:5...	0.540	0.020	0.596	34.963	0.000	0
1	28	0	4	area 4	16:11:0...	0.120	0.080	13.153	34.000	0.000	0
1	29	0	4	area 4	16:11:0...	0.440	0.020	1.584	34.045	0.000	0

FSQ: Summary Table

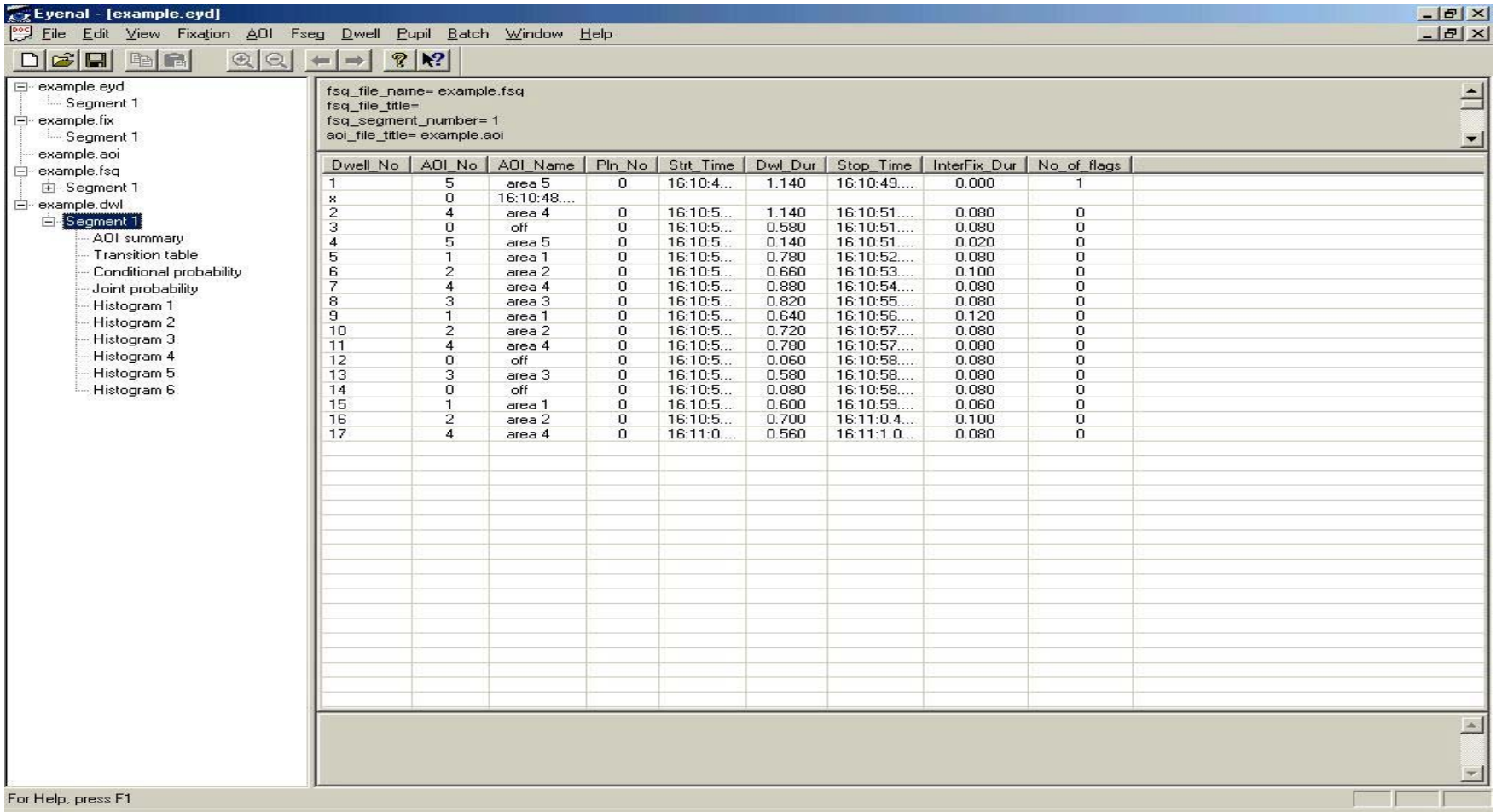


AOI_No	Pln_No	AOI_Name	Sum_Fix_Dur	Fix_Dur_%	Sum_Fix_Cnt	Fix_Cnt_%	Mean_Fix_Dur	Mean_InterFix_Dur	Mean_InterFix_Dist	Mean_PD
0	0	off	0.720	6.630	5	17.241	0.144	0.050	5.218	34.840
1	0	area 1	2.020	18.600	6	20.690	0.337	0.153	0.363	34.600
2	0	area 2	2.080	19.153	5	17.241	0.416	0.030	1.833	34.677
3	0	area 3	1.400	12.891	3	10.345	0.467	0.020	1.676	35.473
4	0	area 4	3.360	30.939	7	24.138	0.480	0.020	1.124	34.402
5	0	area 5	1.280	11.786	3	10.345	0.427	0.020	1.292	34.781

FSQ: Calculate Transitions as well as the Conditional and Joint Probability of those transitions

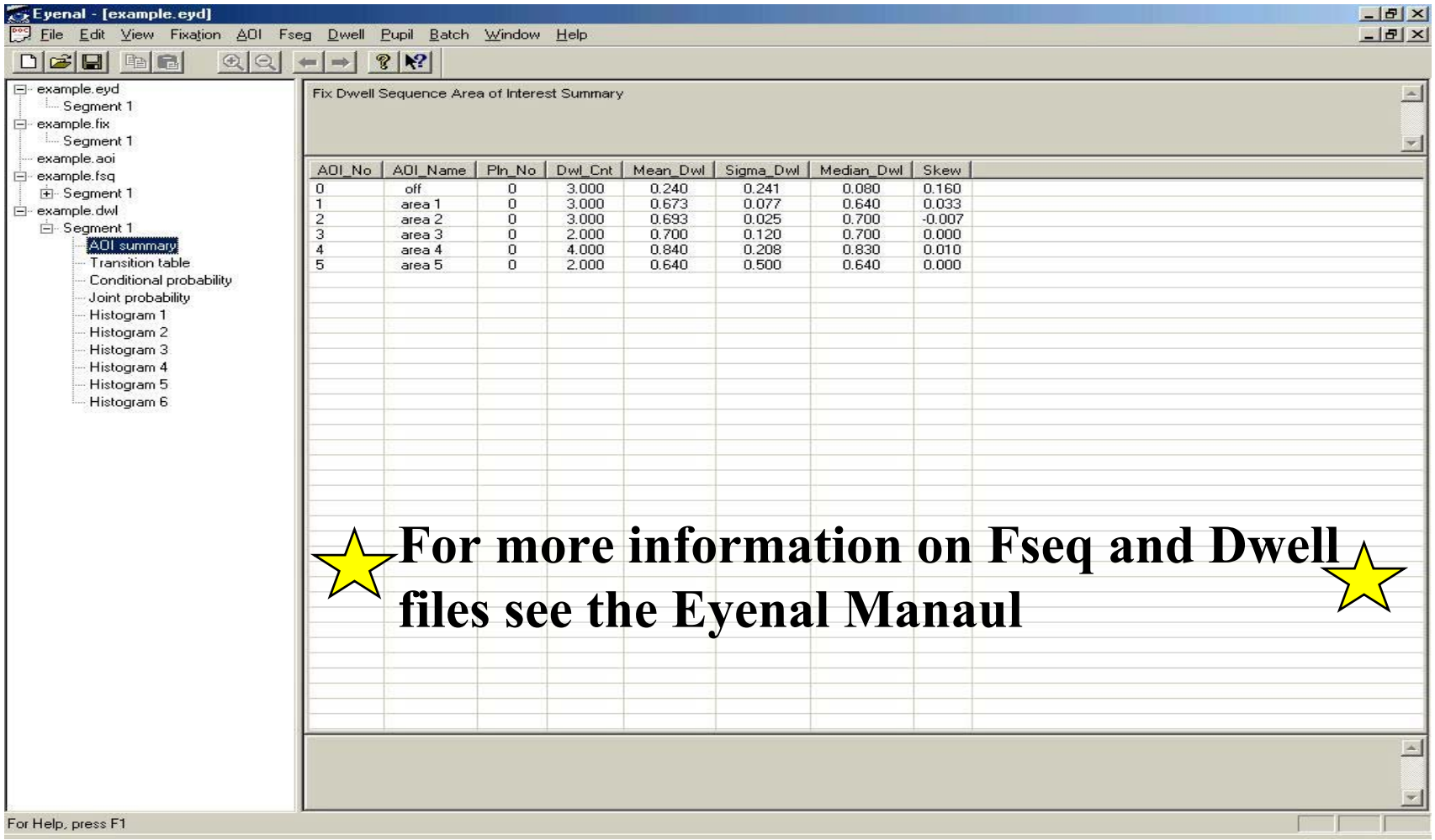


DWELL - reads FSQ files and computes various dwell statistics about fixations on Areas of Interest(AOI). Dwells are defined as periods during which gaze remains within a single area of interest.



Dwell_No	AOI_No	AOI_Name	Pln_No	Strt_Time	Dwl_Dur	Stop_Time	InterFix_Dur	No_of_flags
1	5	area 5	0	16:10:4...	1.140	16:10:49....	0.000	1
x	0	16:10:48....						
2	4	area 4	0	16:10:5...	1.140	16:10:51....	0.080	0
3	0	off	0	16:10:5...	0.580	16:10:51....	0.080	0
4	5	area 5	0	16:10:5...	0.140	16:10:51....	0.020	0
5	1	area 1	0	16:10:5...	0.780	16:10:52....	0.080	0
6	2	area 2	0	16:10:5...	0.660	16:10:53....	0.100	0
7	4	area 4	0	16:10:5...	0.880	16:10:54....	0.080	0
8	3	area 3	0	16:10:5...	0.820	16:10:55....	0.080	0
9	1	area 1	0	16:10:5...	0.640	16:10:56....	0.120	0
10	2	area 2	0	16:10:5...	0.720	16:10:57....	0.080	0
11	4	area 4	0	16:10:5...	0.780	16:10:57....	0.080	0
12	0	off	0	16:10:5...	0.060	16:10:58....	0.080	0
13	3	area 3	0	16:10:5...	0.580	16:10:58....	0.080	0
14	0	off	0	16:10:5...	0.080	16:10:58....	0.080	0
15	1	area 1	0	16:10:5...	0.600	16:10:59....	0.060	0
16	2	area 2	0	16:10:5...	0.700	16:11:0.4...	0.100	0
17	4	area 4	0	16:11:0....	0.560	16:11:1.0...	0.080	0

Dwell statistics



The End

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