Tobii Pro Lab
Product Description

tobii pro

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Please check the Tobii Pro web site at www.tobiipro.com for updated versions of this document.

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1 Introduction

1.1 Overview

This document describes the features and functionality of **Tobii Pro Lab**. This powerful, versatile, and comprehensive software supports the entire research workflow for eye trackers from Tobii Pro. The software comprises three modules: *Designer, Recorder*, and *Analyzer*. Pro Lab is available in four editions: **Full Edition**, **Presenter Edition**, **Analyzer Edition**, and **VR 360 Edition**. The Full Edition contains all three modules; the Presenter Edition contains Designer, Recorder/Stimuli, Presentation and a part of Analyzer's functionality; and the Analyzer Edition contains only the Analyzer module. The Full Edition and the VR 360 Edition contains all three modules but with different eye tracker support.

This document applies to Tobii Pro Lab. The software is continuously being developed and refined. Please visit tobiipro.com for the most recent specifications for the software and for the latest version of this document.

1.2 Modules

1.2.1 Design

You can create experiments in the Designer module based on Timelines consisting of different stimuli. You can also edit stimuli presentation settings like display position, background color, presentation time and stimulus advancement methods, (i.e. end on a mouse click or key press to adapt your experiment). Here you also get a preview of what the stimuli will look like on the screen.

The Designer module works with selected screen-based eye trackers from Tobii Pro and with the HTC VIVE Pro Eye and Tobii Pro VR Integration VR Headsets, but not with Pro Glasses 2.

1.2.2 Record

The Recorder module lets you configure eye trackers from Tobii Pro and present different stimuli, with high timing accuracy. You can read more about this in the Tobii Pro Learning article Stimulus presentation timing in Tobii Pro Lab. You can also validate a calibration, record eye tracking (or mouse-as-gaze) data , mouse clicks and key presses, as well as Galvanic Skin Response (GSR) data from Shimmer3 devices. The participant camera with audio lets you record the participant. Recorder turns into a Moderator view during live viewing of the track status, stimuli displayed and gaze data.

The Recorder module works with selected screen-based eye trackers from Tobii Pro and with the HTC VIVE Pro Eye and Tobii Pro VR Integration VR Headsets, but not with Pro Glasses.

1.2.3 Analyze

The Analyzer module enables you to replay, visualize and analyze your recorded data. It provides data-filtering features, visualizations and the ability to export data for presentations and for further processing in third-party software. In addition, for Pro Glasses 2 based projects, it also provides manual and automatic fixation mapping.

1.3 License models

Pro Lab has two different license models; a *perpetual* –based license model and a *subscription*–based license model. A subscription license provides you with access to the latest software versions as soon as they become available. A perpetual license grants you one year of free upgrades. One– to four–year upgrade contracts are available for perpetual licenses.

If you use the subscription–based model, your Pro Lab must connect to the internet at least once every 14 days to validate the license. If you fail to to do this, your software will cease to function.

1.4 System requirements

For the most up-to-date information about Pro Lab's software system requirements, please visit the Tobii Pro website: https://www.tobiipro.com/product-listing/tobii-pro-lab/system-requirements/

1.5 Tobii eye tracking data transparency

Tobii Pro Lab conforms to Tobii's Data Transparency policy. This policy controls the transferring, storing and analyzing/aggregating the eye tracking, presence and position of data collected during eye tracking.

2 Software Features and Editions

2.1 Project Overview

Feature	Presenter	Analyzer	Full	VR 360
Export project	•	•	•	•
Import project	•	•	•	•

2.2 Designer

Feature	Presenter	Analyzer	Full	VR 360
Design experiments with multiple timelines or use hierarchical structures with randomized presentation (shuffled order, randomized sampling), and repetitions with images and video stimuli	•		•	•
Batch editing of stimuli settings	•		•	•
Use multiple stimuli advance options, either alone or in combination (advance on time, key press, mouse click)	•		•	•
Configure stimulus onset markers (TTL) for synchronization purposes	•		•	•

2.3 Recorder

Feature	Presenter	Analyzer	Full	VR 360
Scene camera project (support for real world experiments using screen based eye trackers)	•		•	
External Presenter project	•		•	
Configure eye tracker settings	•		•	
Define experiment participants	•		•	•
Calibrate eye tracker (regular and infant calibration)	•		•	•
Numeric calibration results (accuracy and precision values)	•		•	
Present image and video stimuli	•		•	•
Record eye tracking, mouse, and keyboard data	•		•	•
Recording of galvanic skin response data from Shimmer3 GSR+ sensors	•		•	•
Moderator view: track status, stimuli displayed and gaze data live	•		•	•
Send stimulus onset markers (TTL) for synchronization purposes	•		•	•

Receive TTL-in markers and the value for synchronization (available for Pro Spectrum and Tobii Pro TX300 eye trackers only)	•		•	
Participant camera	•		•	
Present webpages and make screen recordings	•		•	

2.4 Analyzer

Feature	Presenter	Analyzer	Full	VR 360
Replay of recordings	•	•	•	•
Import Tobii Pro Glasses recordings		•	•	
Manual mapping onto Snapshot images for Glasses, Screen, and Scene Camera projects		•	•	
Assisted mapping onto Snapshot images (Pro Glasses projects only)		•	•	
Create and edit static and dynamic Areas of Interest (AOIs) on images and videos		•	•	•
AOI Tags and Grouping (static and dynamic AOIs)		•	•	•
Log Events for behavioral coding		•	•	•
Times of Interest: define time intervals based on recording and logged Events		•	•	•
Selecting a frame as background and pairing it with Time of Interest (Screen and Scene camera projects only).		•	•	
Plot gaze x and y coordinates as well as eye movement velocity over time		•	•	•
Plot and visualize galvanic skin response (GSR) data over time (together with gaze video replay and eye movements)		•	•	•
GSR data analysis: noise reduction filters and detection of Skin Conductance Responses (SCRs) and Event Related SCRs		•	•	•
Static Heat Map Visualizations on images		•	•	•
Static Gaze Plot Visualizations on images		•	•	•
Video export of recordings and recording segments	•	•	•	
Export eye tracking metrics		•	•	•
Export Event and time interval based metrics		•	•	•
Export GSR Metrics		•	•	•
Export visualizations as images (.png and .jpg)		•	•	•
Export numeric calibration results (accuracy and precision values)	•	•	•	
Export calibration results as images (.png format)	•	•	•	
Recording data to text file (.tsv)	•	•	•	•

2.4.1 Data Export

General data	Description	Format/ Units	Screen project	Glasses project	Scene Camera project	VR360 project
Project name			●	●	●	●
Export date			●	●	●	●
Participant name			●	●	●	●
Participant variables			●	●	●	●
Recording name			●	●	●	●
Recording date	Date when the Recording was performed in this time zone.	YYYY-MM-DD	●	●	●	●
Recording date UTC	Date when the Recording was performed in UTC	YYYY-MM-DD				
Recording start time	Start time of the Recording in this time zone.	HH:MM:SS:FFF	●	●	●	●
Recording start time UTC	Start time of the Recording in UTC format	HH:MM:SS:FFF				
Recording duration	Total duration of the recording	Milliseconds	●	●	●	●
Timeline name	Name of the Timeline used during the Recording (Screen projects only)		●	●	●	●
Recording Fixation filter name	The name of the Fixation Filter applied to the Recording eye tracking data in the export		●	●	●	●
Snapshot Fixation filter name	The name of the Fixation filter applied to the Snapshot eye tracking data in the export (Glasses projects only)			●		
Recording software version			●		●	●
Recording resolution width		Pixels	●		●	●
Recording resolution height		Pixels	●		●	●
Recording monitor latency	The stimulus start and Event timestamps have been offset by this number to account for the monitor latency. (Screen projects only)	Milliseconds	●		●	
Calibration results	Average accuracy and precision of calibration in millimeters, degrees and pixels		●		●	
Recording Timestamp	Timestamp counted from the start of the recording (t0=0)	Milliseconds	●	●	●	●

Participant Video Start	Start Participant video	Millisec-onds	●			
Participant Video End	End Participant video	Millisec-onds	●			
Participant Audio Start	Start Participant audio	Millisec-onds	●			
Participant Audio End	End Participant audio	Millisec-onds	●			
Eye tracker timestamp	The Recording timestamp in the eye tracker clock.	Microsec-onds or millisec-onds	●		●	
Computer timestamp	Eye tracker timestamp translated to local com-puter clock		●	●	●	
Gaze Point X	Horizontal coordinate of the averaged left and right eye gaze point	Pixels (DACS)	●	●	●	●
Gaze Point Y	Vertical coordinate of the averaged left and right eye gaze point	Pixels (DACS)	●	●	●	●
Gaze point left X	Horizontal coordinate of the left eye gaze point.	Pixels (DACS)	●		●	●
Gaze point left Y	Vertical coordinate of the left eye gaze point.	Pixels (DACS)	●		●	●
Gaze point right X	Horizontal coordinate of the right eye gaze point.	Pixels (DACS)	●		●	●
Gaze point right Y	Vertical coordinate of the right eye gaze point.	Pixels (DACS)	●		●	●
Gaze 3D position combined X*	Combined X coordinate of the gaze position in the scene camera coordinate system (Glasses projects only)	Millimeter (HUCS)		●		
Gaze 3D position combined Y*	Combined Y coordinate of the gaze position in the scene camera coordinate system (Glasses projects only)	Millimeter (HUCS)		●		
Gaze 3D position combined Z*	Combined Z coordinate of the gaze position in the scene camera coordinate system (Glasses projects only)	Millimeter (HUCS)		●		
Gaze direction left	Gaze direction (X, Y, Z) of the left eye. For details, see “The Gaze Direction Coordinate System” in this manual.	Millimeters	●	●	●	●
Gaze direction right	Gaze direction (X, Y, Z) of the right eye. For details, see “The Gaze Direction Coordinate System” in this manual.	Millimeters	●	●	●	●

Pupil position left	Pupil Position (X, Y, Z) of the left eye (Glasses projects only)	Millimeters		•		
Pupil position right	Pupil Position (X, Y, Z) of the right eye (Glasses projects only)	Millimeters		•		
Pupil diameter left	Estimated size of the left eye pupil	Millimeters	•	•	•	•
Pupil diameter right	Estimated size of the right eye pupil	Millimeters	•	•	•	•
Validity left	Indicates the confidence level that the left eye has been correctly identified. The available values are *valid* and *invalid*. (Screen projects only)		•		•	
Validity right	Indicates the confidence level that the right eye has been correctly identified. The available values are *valid* and *invalid*. (Screen projects only)		•		•	
Eye position left (DACSmm)	(X, Y, Z) coordinate of the 3D position of the left eye. (Screen projects only)	Millimeters	•		•	
Eye position right left (DACSmm)	(X, Y, Z) coordinate of the 3D position of the right eye. (Screen projects only)	Millimeters	•			
Gaze point left left (DACSmm)	(X, Y, Z) coordinate of the 3D position of the unprocessed gaze point for the left eye on the screen. (Screen projects only)	Millimeters	•			
Gaze point right left (DACSmm)	(X, Y, Z) coordinate of the 3D position of the unprocessed gaze point for the right eye on the screen. (Screen projects only)	Millimeters	•			
Gaze point left (DACSpx)	(X, Y, Z) coordinate of the 3D position of the unprocessed gaze point for the left eye on the screen. (Screen projects only)	Pixels	•			
Gaze point right (DACSpx)	(X, Y, Z) coordinate of the 3D position of the unprocessed gaze point for the right eye on the screen (Screen projects only)	Pixels	•			
Gaze point (MCSnorm)	The normalized X-, Y-coordinate of the averaged left and right eye gaze point in the scene camera coordinate system.	Pixels	•	•	•	•

Gaze point left (MCSnorm)	The X, Y coordinate of the gaze point in scene camera coordinates for the left eye.	Pixels	●	●	●	●
Gaze point right (MCSnorm)	The X, Y coordinate of the gaze point in scene camera coordinates for the right eye.	Pixels	●	●	●	●
Eye movement type	Type of eye movement classified by the fixation filter	Fixation, Saccade, Unclassified, EyesNotFound	●	●	●	●
Gaze Event duration	The duration of the currently active eye movement	Milliseconds	●	●	●	●
Eye movement type index	Count is an auto-increment number starting with 1 for each eye movement type	Number	●	●	●	●
Fixation point X	Horizontal coordinate of the averaged gaze point for both eyes	Pixels	●	●	●	●
Fixation point Y	Vertical coordinate of the averaged gaze point for both eyes	Pixels	●	●	●	●
Event	Name of the Event		●	●	●	●
Event value	The value of any Event parameter, if applicable		●		●	●
Recording media name				●		
Recording media width		Pixels		●		
Recording media height		Pixels		●		
Presented Stimulus name	(Screen projects only)		●			●
Presented Media name	(Screen projects only)		●			●
Presented Media width	The horizontal size of the Media presented on the screen to the Participant, including any scaling set in the Stimulus properties (Screen projects only)	Pixels	●			
Presented Media height	The vertical size of the Media presented on the screen to the Participant, including any scaling set in the Stimulus properties (Screen projects only)	Pixels	●			

Presented Media position X (DACSpx)	The horizontal position of the Media on the screen. The value represents the horizontal position of the left edge of the Media in relation to the left edge of the screen. (Screen projects only)	Pixels	•			
Presented Media position Y (DACSpx)	The vertical position of the Media on the screen. The value represents the vertical position of the top edge of the Media in relation to the top edge of the screen. (Screen projects only)	Pixels	•			
Original Media width	The original horizontal size of the Media presented to the Participant (Screen projects only)	Pixels	•			
Original Media height	The original vertical size of the Media presented to the Participant (Screen projects only)	Pixels	•			
Gaze point X (MCSnorm)	The normalized horizontal position of the averaged left and right eye gaze point on the media (Screen projects only)	Normalized coordinates (MCSnorm)	•		•	
Gaze point Y (MCSnorm)	The normalized vertical position of the averaged left and right eye gaze point on the media (Screen projects only)	Normalized coordinates (MCSnorm)	•		•	
Gaze point left X (MCSnorm)	The normalized horizontal position of the unprocessed gaze point for the left eye on the media (Screen projects only)	Normalized coordinates (MCSnorm)	•		•	
Gaze point left Y (MCSnorm)	The normalized vertical position of the unprocessed gaze point for the left eye on the media (Screen projects only)	Normalized coordinates (MCSnorm)	•		•	
Gaze point right X (MCSnorm)	The normalized horizontal position of the unprocessed gaze point for the right eye on the media (Screen projects only)	Normalized coordinates (MCSnorm)	•		•	
Gaze point right Y (MCSnorm)	The normalized vertical position of the unprocessed gaze point for the right eye on the media (Screen projects only)	Normalized coordinates (MCSnorm)	•		•	
Fixation point X (MCSnorm)	The normalized horizontal position of the fixation point on the Media (Screen projects only)	Normalized coordinates (MCSnorm)	•			

Fixation point Y (MCSnorm)	The normalized vertical position of the fixation point on the Media (Screen projects only)	Normalized coordinates (MCSnorm)	•			
Media width	Enabling this column generates one column per Snapshot in a Glasses project.	Pixels		•		
Media height	Enabling this column generates one column per Snapshot in a Glasses project.	Pixels		•		
Mapped gaze data X [Snapshot Name]	Horizontal coordinate of the gaze point mapped to a Snapshot (Glasses projects only)	Pixels		•		
Mapped gaze data Y [Snapshot Name]	Vertical coordinate of the gaze point mapped to a Snapshot (Glasses projects only)	Pixels		•		
Mapped eye movement type [Snapshot Name]	Type of eye movement classified by the default fixation filter (Glasses projects only)	Fixation, Saccade, Unclassified, EyesNotFound		•		
Mapped eye movement index [Snapshot Name]	An auto-increment number starting with 1 for each mapped eye movement type (Glasses projects only)	Number		•		
Mapped fixation X [Snapshot Name]	Horizontal coordinate of a fixation mapped to a Snapshot (Glasses projects only) Column is empty if the EyeMovement- Type is other than Fixation. Column is not affected by settings in the Fixation Filter. Default fixation filter is applied.	Pixels		•		
Mapped fixation Y [Snapshot Name]	Vertical coordinate of a fixation mapped to a Snapshot (Glasses projects only) Column is empty if the EyeMovement- Type is other than Fixation. Column is not affected by settings in the Fixation Filter. Default fixation filter is applied.	Pixels		•		

Automatically-mapped gaze data score [Snapshot name]	Validity score of the automatically-mapped gaze point- enabling this column generates one column per Snapshot (Glasses projects only)	Pixels		•		
Automatically-mapped gaze data X [Snapshot name]	Horizontal coordinate of the automatically-mapped gaze point (Glasses projects only)	Pixels		•		
Automatically-mapped gaze data Y [Snapshot name]	Vertical coordinate of the automatically-mapped gaze point (Glasses projects only)	Pixels		•		
Manually-mapped gaze data X [Snapshot name]	Horizontal coordinate of the manually-mapped gaze point.	Pixels		•		
Manually-mapped gaze data Y [Snapshot name]	Vertical coordinate of the manually-mapped gaze point (Glasses projects only)	Pixels		•		
AOI hit [Snapshot/Image Name – AOI Name]	Reveals if there is a fixation within a given AOI on a given Snapshot 0 = No fixation within AOI 1 = Fixation within AOI	0;1		•		•
Gyro	Rotation along the X, Y, and Z axis in degrees/second (Glasses projects only)	degrees/second		•		
Accelerometer	Acceleration along X, Y, and Z axis in degrees/second^2 (Glasses projects only)	meter/second^2		•		
Galvanic skin response (GSR)	The raw galvanic skin response signal of the participant received from the Shimmer GSR sensor.	micro Siemens	•		•	•
Head rotation	The coordinates of the participant's head rotation quaternion.	Normalized coordinates				•
Mouse Position X and Y	Mouse position along the X and Y axis.	Pixels	•			

2.4.2 Metrics Export

Metrics can be exported to two different formats:

- The Interval-based TSV file format is intended to be loaded into a statistical software, like R or SPSS, for further analysis. It is formatted as a tab-separated text file in which every row holds the results for one Time of Interest interval. Each metric or other property is presented in columns in this format. This format has the most metrics, including saccades, available for selection.
- The Excel report format is designed for easy readability in Microsoft Excel or compatible applications. This format presents the metrics in an aggregated form. Every metric is presented as a separate sheet in the Excel workbook. It contains tables showing the results, including averages and totals, for each Time of Interest.

Interval-based TSV file:

The metrics available for export to a TSV file are shown in the table below:

Duration of interval
Start of interval
Time to first Event
Number of Events
Total duration of fixation
Average Duration of fixation
Number of fixations
Time to first fixation
Duration of first fixation
Total duration of whole fixations
Average duration of whole fixations
Number of whole fixations
Time to first whole fixation
Duration of first whole fixations
Total duration of Visit
Average duration of Visit
Number of Visits
Total duration of Glances
Average duration of Glances
Maximum duration of Glances
Minimum duration of Glances
Number of Glances
Number of clicks
Time to first click
Time from first fixation to mouse click
Average GSR
Amplitude of event related SCR
Number of GSR
Number of saccades
Average peak velocity of saccades
Minimum peak velocity of saccades
Maximum peak velocity of saccades
Standard deviation of peak velocity of saccades
Average amplitude of saccades
Minimum amplitude of saccades
Maximum amplitude of saccades
Total amplitude of saccades
Time to first saccade
Direction of first saccade
Peak velocity of the first saccade

Average velocity of the first saccade
Amplitude of the first saccade
Number of saccades in AOI
Time to entry saccade
Time to exit saccade
Peak velocity of entry saccade
Peak velocity of exit saccade

Excel report:

The metrics available for export to an Excel report are shown in the table below:

Duration of interval
Start of interval
Time To First Event
Number of events
Number of events (include zeroes)
Total duration of fixation in AOI
Total duration of fixation in AOI (include zeroes)
Average duration of fixation in AOI
Number of fixations in AOI
Number of fixations in AOI (include zeroes)
Time to first fixation in AOI
Duration of first fixation in AOI
Total duration of Visit
Total duration of Visit (include zeroes)
Average duration of Visit
Number of Visits
Number of Visits (include zeroes)
Number of clicks in AOI
Number of clicks in AOI (include zeroes
Time to first click in AOI
Time from first fixation to mouse click in AOI
Number of clicks in AOI (include zeroes)
GSR Average
ER-SCR amplitude
SCR count

Support for Your Tobii Pro Device

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For questions or problems with your product, contact your Tobii Pro sales representative or authorized reseller for assistance. They are most familiar with your personal setup and can best help you with tips and product training.

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