Pro Fusion
Product Description

tobii pro

Pro Fusion Product Description

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1 Overview of Tobii Pro Fusion

Tobii Pro Fusion is the next generation of compact high-performance eye trackers from Tobii Pro. It provides a flexible solution that supports different research scenarios and study designs.

Pro Fusion has a slim design that integrates well with external monitors up to 24 inches and laptop screens. The eye tracker can also be mounted on a tripod and coupled with a scene camera so it can be used in study setups that use real-world stimuli such as physical objects or scenes. The sampling speed of up to 250 Hz allows you to capture data for a wide range of experimental paradigms (fixation, smooth pursuit, and saccade-based).

With high, selectable, sampling rates (up to 250 Hz), two eye tracking cameras and two pupil tracking modes (bright and dark pupil), Pro Fusion enables you to adapt your data collection setup to different research populations, scenarios, and date requirements.

Use Pro Fusion for studies on:

- Windows laptop and desktop computers
- PC monitors, 24″ (16:9) or less
- Real-world setups such as physical objects and social interactions (using the Tripod Stand)
- Larger screens, projections, simulators (using the Tripod Stand)

1.1 Pro Fusion System requirements

Operating system:	Windows 10 macOS 10.14 Mojave and 10.15 Catalina
CPU:	1 GHz, 2 cores
RAM:	2 GB RAM memory* *Software for eye tracking research may require higher RAM
Port:	USB Type-A or USB Type-C

1.2 Product versions

Pro Fusion is available in two different product versions: 120 Hz and 250 Hz. The 120 Hz version can be upgraded to the faster version by contacting your sales representative.

1.3 Key features

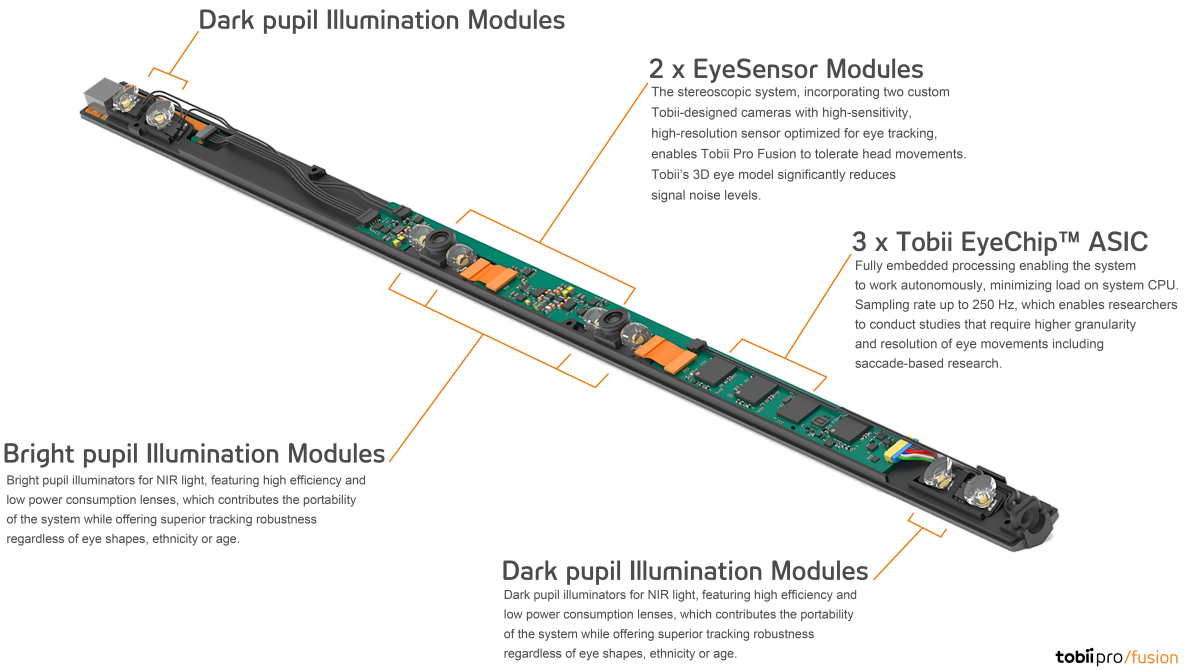

Figure 1. Pro Fusion's key features

1.4 What's in the Pro Fusion box

Figure 2. What's in the Pro Fusion box

#	Item	Additional information
1	Travel case	Stores, protects, and carries Pro Fusion and the included accessories
2	Pro Fusion eye tracker	Used for eye tracking

3	AC power adapter	Provides the additional power required when the USB Type-A to Type-C adapter is used
4	Safety and Compliance	Printed versions of important information
5	USB Type-A to Type-C adapter plug	Used when the computer does not have a USB Type-C port
6	6 International plug adapters	Used with the AC power adapter to match international outlets
7	Cleaning cloth	For cleaning the surface of the eye tracker
8	Four mounting plates with non-permanent adhesive	Attaches the Pro Fusion eye tracker to the screen bezel
9	Four cleaning wipes	Removes any dust and grease in the area around the screen before attaching a mounting plate

1.5 Tobii Pro Eye Tracker Manager

Tobii Pro Eye Tracker Manager is free software available on Tobii Pro Connect.

Pro Eye Tracker Manager helps you manage your Tobii Pro eye tracker. It lets you see which eye tracker firmware and software versions you are running and also facilitates updates (where applicable). It provides:

- Drivers and Firmware installation or updates
- Display setup
- Positioning guide
- User calibration
- Gaze visualization*

*Gaze visualization in Pro Eye Tracker Manager lets you quickly evaluate the quality of the eye tracking data. The Gaze visualization overlaps data only on the Pro Eye Tracker Manager screen while Pro Eye Tracker Manager is open.

References in product documentation to Tobii Pro Eye Tracker Manager refer to the latest version available on Tobii Pro's website.

1.6 Tobii Pro accessories

Find out more about Tobii Pro products and accessories on tobiipro.com.

1.7 Additional software options

Pro Lab tobiipro.com/product-listing/tobii-pro-lab/	Pro Lab is a comprehensive research software platform for eye tracking designed to meet the highest demands on different research scenarios with exact timing accuracy. This software offers an efficient workflow, making it easy to design experiments, record data, analyze and visualize eye tracking data, and to sync this data with other biometric data streams.
Pro SDK tobiipro.com/product-listing/tobii-pro-sdk/	Pro SDK offers a broad set of tools that makes it simple to develop a variety of niche applications or scripts across multiple platforms, using a wide range of programming languages. This SDK gives the researcher access to the full set of relevant gaze data streams, such as 3D eye coordinates, raw data, pupil data, etc.
Third-party software	This term refers to any application built on Pro SDK.

2 Technical Specifications

2.1 Eye tracking specifications

Eye tracking technique	Video-based pupil- and corneal reflection eye tracking with dark and bright pupil illumination modes.* Two cameras capture stereo images of both eyes for robust accurate measurement of eye gaze and eye position in 3D space, as well as pupil diameter.
Sampling frequency	60, 120, & 250 Hz or 60 & 120 Hz, depending on the hardware version
Precision**	0.04° RMS at optimal conditions*** 0.2° RMS in optimal conditions (raw signal)
Accuracy**	0.3° in optimal conditions
Binocular eye tracking	Yes
Total system latency	3 frames (<12 ms at 250 Hz)
Blink recovery time	1 frame (immediate)
Gaze recovery time	250 ms
Data sample output****	Timestamp Gaze origin Gaze point Pupil diameter
Eye image data stream	Eye image data stream frequency is approximately 4 Hz (one image per eye). Zoomed-in eye images available in tracking mode. Full-frame camera images are available in gaze recovery mode.
TTL input stream	Not Available
Tracker and client time synchronization	Integrated between the eye tracker time domain and the client computer time domain

* Dark pupil tracking is supported in all sample frequencies. Bright pupil tracking mode is supported at 60 and 120 Hz.

** Tobii Pro uses an extensive test method to measure and report performance and quality of data. Please download the Tobii Pro Fusion Eye Tracker Data Quality Test Report for more detailed information.

*** Applying Savitzky-Golay filtering (settings listed in the Tobii Pro Fusion Eye Tracker Data Quality Test Report).

**** For more information about output data and the supplementary data stream, read the Tobii Pro SDK documentation.

2.2 Setup

Head movement tolerance*	Excellent. Dual-camera system with more images than a one camera system which gives a more accurate data calculation and the best level of precision and robustness for head movement.
Freedom of head movement (at 65cm distance)*	Width × height: 40 cm × 25 cm (15.7" × 9.84") (At least one eye tracked)
Freedom of head movement* (at 80 cm distance)	Width x height: 45 cm x 30 cm (17.7" x 11.8") (At least one eye tracked)
Operating distance (mounted on screen)	50–80 cm (19.69”–31.49”) from the eye tracker
Tracker setup options	Tracker mounted on tripod, allows for even larger screens and physical objects to be tracked.
Optimal screen size	24" (16:9 aspect ratio)

* Describes the region in space where the participant can move their head and still have at least one eye within the eye tracker’s field of view (trackbox) at the specific distance.

2.3 Software compatibility

Software and framework compatibility	Tobii Pro Lab Tobii Pro Eye Tracker Manager Tobii Pro SDK Any application built on the Tobii Pro SDK
Operating system	Microsoft Windows, Apple Mac

2.4 Hardware versions

120 Hz
250 Hz

2.5 Pro Fusion eye tracker specifications

Dimensions	374 mm L × 18 mm H × 13.7 mm W (14.72“ × 0.70“ × 0.53“)
Weight	168g (5.9 oz.)
Connectors	USB Type-C (USB Type-A to Type-C adapter provided) AC power
Data processing	3 Tobii EyeChip™ ASIC with fully embedded data processing
Eye tracking cameras	2 x Tobii EyeSensor™ Modules

Illuminators	Dark Pupil Illumination Modules Bright Pupil Illumination Modules
Power consumption	Typical power consumption: 4.3 W Max. rated power consumption: 9 W
Power options	Directly via USB Type-C connector, or with provided AC power adapter, when using a computer with USB 2.0 Type-A port

3 Compliance Information

3.1 CE Compliance

This Tobii Pro eye tracker is CE-marked, indicating compliance with applicable health and safety legal requirements set out in the European Union and EEA.

3.2 VCCI Compliance

この装置は、クラスB機器です。この装置は、住宅環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。 VCCI ー B

3.3 FCC interference statement

This Tobii Pro eye tracker has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. The eye tracker can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the eye tracker does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by increasing the separation between the eye tracker and the receiver. Modifications not expressly approved by Tobii Pro AB could void the user's authority to operate the equipment under FCC rules.

3.4 General Compliance

3.4.1 FCC interference statement

Pro Fusion has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. Pro Fusion can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If Pro Fusion does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by increasing the separation between Pro Fusion and the

receiver. Modifications not expressly approved by Tobii Pro AB could void the user's authority to operate the equipment under FCC rules.

3.4.2 Industry Canada statement

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

3.4.3 CE statement

Pro Fusion is CE-marked, certifying compliance with the legal requirements for health, safety and environmental protection requirements for the European market. Pro Fusion complies with the following directives:

- 2011/65/EU (RoHS 2) - Restriction of Hazardous Substances Directive
- 2014/30/EU (EMC) - Electromagnetic Compatibility Directive
- 2012/19/EU (WEEE) - Waste Electrical and Electronic Equipment Directive

3.4.4 Safety compliance

Pro Fusion complies with the following standards:

- IEC/EN 62471:2008, Photo Biological Safety of Lamps and Lamp Systems
- IEC 60950-1:2005 +A1 +A2, Safety of Information Technology Equipment
- IEC/EN 62368-1, including collateral standard IEC 62368-3 (European Standard)
- CAN/CSA-C22.2 No. 62368-1/UL 62368-1 Edition No. 2, including collateral standard IEC 62368-3 (US and Canadian Standard)
- J60950-1(H22) (Japanese Standard)
- GB 4943.1-2011 (Chinese Standard)

3.4.5 EMC compliance

Pro Fusion complies with the following standards:

- EN 55032:2015, Electromagnetic compatibility of multimedia equipment. Emission requirements (European standard
- EN 55035:2017 Electromagnetic compatibility of multimedia equipment - Immunity requirements
- FCC part 15 Class B, Regulations under which an intentional, unintentional, or incidental radiator that can be operated without an individual license (American Standard)
- ICES-003 Issue Class B, Interference-Causing Equipment Standard (Canadian Standard)
- CISPR32:2015, Electromagnetic compatibility of multimedia equipment - Emission requirements (International standard accepted in AS/NZS and Japan)
- GB17625.1-2012 and GB9254-2008 (Chinese national standard)
- KN32 (CISPR 32), KN35 (CISPR 35) (South Korean Standard)

4 Safety

4.1 Mounting warning

Tobii Pro eye trackers should be mounted according to Tobii Pro´s instructions for approved mounts.

The mounting bracket is designed for adhesion to a wide variety of surfaces, such as monitors or laptop screens. It is also designed for clean removability. Failure to follow the recommended removal instructions can result in damage to both the monitor/laptop and the mounting bracket. Do not mount the eye tracker on monitors positioned above the head or face of a user, as it might fall.

4.2 Emergency warning

Tobii Pro eye trackers are designed to be used only for research purposes. Be aware that due to the low, but possible risk of failure or distraction, the eye tracker should not be relied upon or used in dangerous or critical situations.

4.3 Epilepsy warning

Some people with photosensitive epilepsy are susceptible to epileptic seizures or loss of consciousness when exposed to certain flashing lights or light patterns in everyday life. This may happen even if the person has no medical history of epilepsy or has never had any epileptic seizures.

A person with photosensitive epilepsy would also be likely to have problems with TV screens, some arcade games, and flickering fluorescent bulbs. Such people may have a seizure while watching certain images or patterns on a monitor, or even when exposed to the light sources of an eye tracker. It is estimated that about 3-5% of people with epilepsy have this type of photosensitive epilepsy. Many people with photosensitive epilepsy experience an “aura” or feel odd sensations before the seizure occurs. If you feel odd during use, move your eyes away from the eye tracker.

4.4 Infrared warning

When activated, the Tobii Pro eye tracker emits pulsed infrared (IR) light. Certain medical devices are susceptible to disturbance by IR light and/or radiation. Do not use the eye tracker in the vicinity of these kinds of susceptible medical devices, as their accuracy or proper functionality could be inhibited. Do not stare into the LED lights at a close distance (<15cm).

4.5 Magnetic field warning

This Tobii Pro eye tracker contains magnets. Magnetic fields may interfere with the function of cardiac pacemakers and implantable cardioverter defibrillators. As a general rule, maintain a minimum distance of 6 inches (15 centimeters) between any item with magnets and your heart device.

4.6 Child safety

A Tobii Pro eye tracker is an advanced computer system and electronic device. As such, it is composed of numerous separate, assembled parts. In the hands of a child, some of these parts have the possibility of being separated from the device, possibly resulting in a choking hazard or other danger to the child.

Young children should not have access to, nor use of the device or its accessories without parental or guardian supervision.

4.7 Electricity

Do not open the casing of the Tobii Pro eye tracker, this could expose you to potentially hazardous electrical voltage. The device contains no user-serviceable parts. Non-compliance will result in loss of warranty! Contact Tobii Pro Support if your eye tracker is not working properly.

4.8 Accessories

Only use accessories provided by or approved by Tobii Pro AB.

4.9 Third party

Any use of a Tobii Pro eye tracker outside the intended use and together with any third-party software or hardware that changes the intended use is a risk, and Tobii Pro AB can not take any responsibility in these situations.

4.10 Power supply

Only use the AC power adapter provided by Tobii Pro to power your Tobii Pro eye tracker. If the AC power adapter is damaged, it should be replaced only by Tobii Pro Service Personnel. If damaged, do not use the AC power adapter until it has been replaced. Tobii Pro and its agents are not liable for any damages or injuries to a person or property due to incorrect use of the provided accessories.

5 Product Care

5.1 Operational environment

The recommended range for temperature and humidity during operations is:

- **Temperature**: 10°C to 35°C (50°F to 95°F)
- **Humidity**: Max 20% to 95% (no condensation on the device)

5.2 Transportation and storage

Use the provided case when traveling with the eye tracker. For shipping and storage, use the original packing.

For transportation and storage, the recommended range for temperature and humidity for the device is as follows:

- **Temperature**: -40°C to 70°C (-40°F to 158°F)
- **Humidity**: 20% to 95% (no condensation on the device)

Tobii Pro eye trackers are not waterproof or water resistant. The eye tracker should not be kept in excessively humid, damp or wet conditions. Do not submerge the eye tracker in water or in any other liquid. Be careful not to spill liquids on the device.

5.3 Cleaning

- Before cleaning your Tobii Pro eye tracker, unplug its USB cable and electrical cable if there is one.
- Use the included cleaning cloth and clean the eye tracker's front gently.
- Avoid getting moisture in openings on the device.
- Do not use window cleaners, household cleaners, aerosol sprays, solvents, alcohol, ammonia, or abrasives.

Scratches on the front surface of the eye tracker may impair its performance.

5.4 Disposal of the eye tracker

Do not dispose of your Tobii Pro eye tracker in general household or office garbage receptacles. Follow your local regulations for the proper disposal of electrical and electronic equipment.

5.5 Limitation of liability

Except where prohibited by law, Tobii Pro AB is not liable for any loss or damage arising from the use or misuse of a Tobii Pro eye tracker or the mounting plate, whether direct, indirect, spe-

cial, incidental or consequential, regardless of the legal theory asserted, including warranty, contract, negligence, or strict liability.

Appendix A Support, Training, and Warranty

A1 Customer Support

If you need help, please contact Customer Support at Tobii Pro. In order to receive assistance as quickly as possible, make sure you have access to your Tobii Pro device and, if possible, an Internet connection. You should also be able to supply the serial number of the device, which you will find on a sticker on the back or bottom of the device.

A1.1 Get help online

Many questions can be answered by visiting Tobii Pro Connect. It contains the latest information about contacting Support, helpful articles and FAQs, links to downloads, and much more. Log in or register to see information about your account and to reach Customer Support on Tobii Pro Connect.

A2 Training and Education Services

If you are new to eye tracking, or want to extend your knowledge about eye tracking research, sign up for one of our learning programs and events on our website at Training and Education Services.

A3 Warranty information

Read more online about Tobii Pro Care and Tobii Pro's eye tracker warranty.

Appendix B Limitations and considerations

B1 Intended use

Tobii Pro eye trackers are intended to be used in research activities about human behavior including eye movements, in a dry and dust free indoor environment. The product should only be used as described in this User's Manual. Please read the User Manual and other supplied documentation thoroughly before using the product.

B2 Light conditions

Tobii Pro recommends that eye tracking studies be performed in a controlled environment. Sunlight should be avoided since it contains high levels of infrared light which will interfere with the eye tracker system. Sunlight affects eye tracking performance severely and longer exposure can overheat the eye tracker. This eye tracker is not designed for exposure to (direct) sunlight. Eye tracking generally does not work in strong direct sunlight.

Shielding the eye tracker adequately from the sun may prevent sunlight from interfering with eye tracking.

B3 Eyelashes

Long eyelashes can be obstructive when the participant's eyes are less open, especially if the participant is wearing mascara. In rare cases, eyelashes may completely block the view of the participant's pupils, making eye tracking impossible.

B4 Droopy eyelids

Droopy eyelids or otherwise obstructive eyelids can block the view of the participant's pupils. In rare cases, such eyelids may completely block the view of the participant's pupils, making eye tracking impossible.

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Support for Your Tobii Pro Device

Get Help Online

Visit Tobii Pro Connect for help with your Tobii Pro device. It contains the latest information about contacting Support, links to our Learning Center, and much more. Visit connect.tobiipro.com.

Contact Your Solution Consultant or Reseller

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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