

Guide for Asymmetric Scotoma Simulation

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System Requirements:

Either;

- **A windows 10 or higher system with a NVIDIA Quatro, or other stereoscopic capable graphics card with the pupil capture application installed:**

Or

- **One windows 10 or higher system with the pupil capture application installed, and a separate machine with a stereoscopic capable graphics card. This option also requires either an ethernet or network connection.**

Set Up and Calibration

1. **The scotoma simulation works alongside the Pupil Labs software suite. Please install the applications (<https://pupil-labs.com/products/core/>).**
2. **(Only necessary for remote pupil capture) Connect the two computers, either using an ethernet cable, or using a home network (i.e. – one without a firewall).**
3. **Plug in the 3D capable projector and turn on 3D over and under mode.**
4. **Ensure that the resolution for the projected screen is set to “1200x800 @ 120Hz”, this may require you to use the advanced setting or “list modes” selection screen.**
5. **Connect the eye tracker to the computer using the USB ports, and open Pupil Capture, ensure that both eyes are selected in the “General Settings” tab, and adjust the below eye cams to ensure good pupil detection.**
6. **Navigate to the “Plugin Manager” tab visible on the right-hand panel and ensure that the following plugins are enabled: Fixation detector, Network API, Head Pose Tracker, Surface Tracker, Accuracy Visualizer.**
7. **Calibrate the eye tracker by pressing the encircled C, “calibrate” button on the left-hand side of the screen.**
8. **(Only necessary for first time set up) In order to name and create the surface to be tracked, display the following image on the projected screen. With the surface tracker tab open, and the “world camera” pointed toward the screen such that all four tags are visible, and highlighted, click on the “Add Surface” button. Be sure to rename the surface as “surface” if it is not already.**



9. Launch the simulation software on the computer connected to the projector and select a tracker. Note: Remote is to be selected when using a two-computer set up, Local is to be selected where both the simulation and pupil capture can be run on the same system. Optionally, a text prompt can be entered at this time to be displayed during the simulation. Press submit.
10. (Only for remote) Enter the IP address and port as found in the Network API plugin tab, under the “Connect Remotely Heading” and click submit.
11. The control panel and simulation should now be launched (see troubleshooting for help at this stage). Adjust your location and angle to the screen in order to align the yellow box created during calibration, and the center of the four April tags found in the corners of the screen.
12. Use the control panel to increase the size of the scotoma from 0 to the desired size, offset, text prompt size and relative location can also be selected at this time. Note that each side of the eye is controlled independently.
13. If you wish to record gaze locations, or other data about the experiment, return to the pupil capture window and press the encircled R, “record” button.
14. If the record function was used, the generated recording can be opened in Pupil Player for further analysis. Further information about this process can be found on the Pupil Labs website (<https://pupil-labs.com/products/core/>)

Troubleshooting:

I entered the IP address shown in pupil capture, but no simulation window was created.

- Ensure that the ethernet, or wireless connection is stable. If the remote IP shown is 127.0.0.1, no network can be found.
- Ensure that your computer does not have a firewall which may block incoming or outgoing networks, if so, try adjusting settings or turning the firewall off.
- Try turning the Network API plugin on and off again, checking that the IP address and port number have not changed.
- Try disconnecting from other wireless networks, leaving only the ethernet, or relevant wireless connection.

My simulation window froze, or my adjustments in the control panel are not seen on the projection.

- Ensure that the four april tags are visible and highlighted in the pupil capture window.
- Try turning the Network API plug in off and on again.
- Try restarting the application.
- Ensure there was not a change in your network connection.

The simulated scotoma does not align with where I am looking.

- Ensure that the yellow rectangle generated during calibration is well aligned with the center of the four April tags.
- Try recalibrating again, to an accuracy of under 2 degrees.
- Try adjusting the eye cameras to ensure that the pupil is detected correctly (indicated by a red circle around the pupil. Adjust the camera such that when you look from side to side, the pupil does not move out of frame.

I have an issue related to the Pupil Capture Application.

- Check out the pupil labs website to view their troubleshooting page.
- Join the Pupil Discord channel to get assistance.

Stuck?

- Email me at sophiedavidsonengineering@gmail.com, or call me on +61 424 816 283.