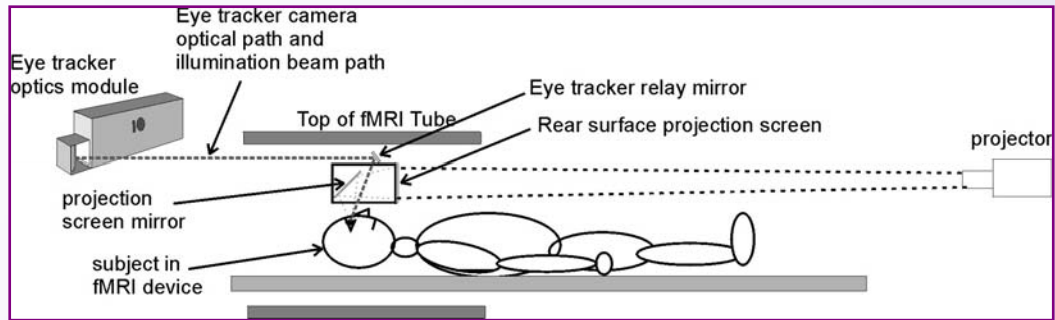




Eyetracking Expertise

fMRI Frequently Asked Questions



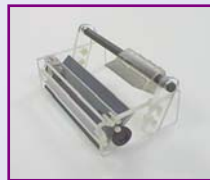
Does the Eyetracker cause interference in the fMRI data or images? Conversely, does the fMRI cause interference with the eyetracker data?

We are not MR experts but, to the best of our knowledge, our customers have not experienced either eye image interference from the MR device or MR image interference from the eye tracker. This system has been installed in magnets ranging from 1.5T to 4T. The optics can track at a distance of up to 16 feet. This means the optics could be placed outside the magnet room and view the eye through a wave guide.

What is required to install the Eyetracker in the fMRI?

The only component that actually mounts in the magnet bore is a 1" relay mirror. This is attached to the head coil. ASL has several mounts available, one of which may work in your system. ASL will help you design a custom mount or build it for you, if required.

Examples of available mounting brackets



The optics module is normally mounted in the fMRI room on a shelf up to 16' from the eye. ASL will supply an adjustable free standing shelf that can be used to hold the optics.

What if the bore is tight and there is no room for the relay mirror?

ASL have often run into situations where there is not room for a relay mirror. An example of this is the Siemens Allegra 3T. In those instances the mirror used for displaying the stimulus is used to also track the eye.

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Will the eye tracker work with my stimulus display?

The eye tracker will work with any stimulus display as long as we can view the eye from outside the scanner.

Can your system measure saccades?

Yes. The system includes a camera that can be configured at 60, 120 or 240 Hz.

Can your system measure pupil size?

Our system measures and outputs real time pupil size.

Can either eye be tracked?

Yes. By positioning the 1" mirror over either eye and adjusting aiming mirror in optics module, either eye can be tracked.

What does your system measure? Can I use this data real time? How?

The system outputs real time X and Y coordinates and pupil size that the experimenter can use for any purpose. This data is available in analog, digital and video. In addition, the system will import data (16 bit parallel digital port, TTL level positive true) that can also be used to flag data.

Can I record the data and analyse it offline? How?

The ASL 6000 series of eye trackers include our EYENAL™ and FIXPLOT™ software programs for analyzing and displaying the collected data. This software allows you to do the following:

- Reduce data to a list of fixations
- Specify areas of interest (AOI)
- Match fixations with AOIs
- Compute statistics relating fixations to AOIs
- Superimpose plot of fixation "scan path" over image viewed by subject

I am running a 1.5T now, but will upgrade to a 3T soon. Will your eyetracker work in both?

The system will work with any scanner where we can view the eye from outside the scanner.

What is involved in installation and training?

Once a system is purchased, ASL engineers will work with you to determine the best installation configuration. When the eye tracker is delivered, ASL personnel will set up the system in a lab and train you on its use. When you are ready to install the eye tracker in the fMRI, ASL will assist in the installation and calibration.

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How involved is setup and calibration for each subject? How long does it take?

Once the system has been installed, setup between subjects is quick and easy. Normally minor adjustments are made to the relay mirror to insure proper alignment before the subject is moved into the magnet. Calibration consists of the subject looking at 9 predetermined points while the operator insures proper discrimination and depresses a key for each point. Calibration should take 30 seconds or less. The system can be configured to measure any number of points, from one to nine.

What is involved in setting up and taking down between uses?

Since the only component mounted in the magnet is the small relay mirror, setting up or taking down consists of attaching or detaching the mirror from the coil. The rest of the system does not have to be moved. If the mirror is not in the way, there is no need to remove it from the system when it's not in use.

How robust is your system? Will it work with contacts? Glasses?

The ASL system is the only one that uses the bright pupil illumination technique which has been shown to provide better contrast between the pupil and background features, and to produce an image with fewer undesirable artifacts than does the dark pupil illumination technique. This results in a more robust eye tracker performance (i.e. acceptable performance over a wider range of subjects, equipment placement geometry and other environmental variations including glasses and contact lenses).

The bright pupil technique offers even greater advantages as the distance between the subject and the optics increases. The bright pupil signal is a nearly collimated beam retro-reflected from the retina, and therefore its intensity diminishes very little as distance between the eye and camera increases. The isotropic reflections from the surrounding features appear to diminish in brightness with the square of the distance. Thus, contrast between the bright pupil and the surrounding features actually improves with increasing eye to camera distance, whereas it becomes more and more difficult to distinguish a dark pupil from increasing dark surrounding features as eye to camera distance increases."

Who is using your system?

The ASL Model R-LRO6 has been in use for over 4 years with installations around the world. A list of users is available upon request.