



fMRI FAQs

DOES THE EYE TRACKER CAUSE INTERFERENCE IN THE fMRI DATA OR IMAGES? CONVERSELY, DOES THE fMRI CAUSE INTERFERENCE WITH THE EYE TRACKER 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.

WHAT IS REQUIRED TO INSTALL THE EYE TRACKER 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. The optics module is normally mounted in the fMRI room on a shelf up to 16' from the eye.

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 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 REALTIME? 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 ANALYZE IT OFFLINE? HOW?

The ASL 5000 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*



fMRI FAQs

- *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 (approximately 1" of clearance is required).

WHAT IS INVOLVED IN INSTALLATION AND TRAINING?

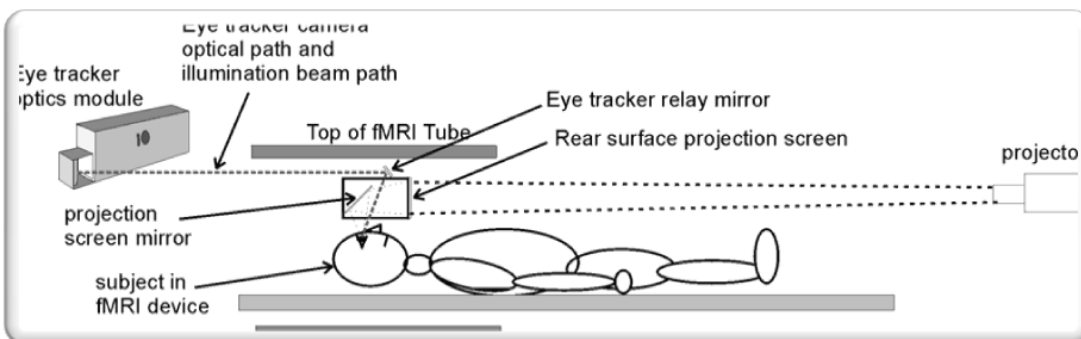
Once a system is purchased, ASL engineers will work with you to determine the best installation configuration. When the eye tracker is delivered, ASL personnel will set up the system in a lab and train you on it's use. When you are ready to install the eye tracker in the fMRI, ASL will assist in the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

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.

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.



Applied Science Laboratories
175 Middlesex Turnpike, Bedford MA 01730 USA

Tel.: (781) 275-4000 Fax: (781) 275-3388 www.asleyetracking.com Email: asl@asleyetracking.com



fMRI FAQs

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?

A partial list of current users are on the table below.

Contact	Company	Contact info
Darren Gitleman	Northwestern University	312-908-9023 d-gitleman@nwu.edu
Daphne Bavlier	University of Rochester	716-275-7747 daphne@bcs.rochester.edu
Terry Morris (Director) Oliver Josephs (Operator)	Institute of Neurology	171-833-7498 ojosephs@fil.ion.ucl.ac.uk
Neal Cohen	University of Illinois	217-244-4339 ncohen@psych.uiuc.edu Installation in process.
Jonathon King	University of Missouri	(573)882-8758 kingjw@showme.missouri.edu
Ivan Toni Peter Weiss Dr. John Shah	Institute of Medicine Juelich, Germany	49-2462-61-2483 p.h.weiss@fz-juelich.de
Gordon Shulman	Washington University	(314) 362-8880 gordon@npg.wustl.edu

Applied Science Laboratories
175 Middlesex Turnpike, Bedford MA 01730 USA

Tel.: (781) 275-4000 Fax: (781) 275-3388 www.asleyetracking.com Email: asl@asleyetracking.com