

APPLIED SCIENCE LABORATORIES:

EYE TRACKING MAKES DRIVING SIMULATORS MORE EFFECTIVE

Focus and vision have brought Applied Science Laboratories of Bedford, Massachusetts, to the forefront of the eye tracking industry. ASL makes eye tracking devices. Its vision is to pursue applications across a broad range of human needs.

Eye tracking determines how and where a person is looking. This may be on a single facing surface or multiple surfaces in 3D space. Eye tracking can monitor where a subject gazes on a computer monitor, keyboard, poster display, or slide projection. In fields such as human factors and ergonomics, marketing research, psychology and cognition, simulation and training, eye tracking has been employed to study where people look on everything from museum displays and basketball hoops to aircraft windows.

Driving simulators in particular have taken advantage of eye tracking to monitor eye position and point of gaze for auto design, safety and instruction. ASL's EYEHEAD™ Integration is currently providing the eye tracking component in many driving simulation studies.

At the University of South Dakota's Heimstra Human Factors Labs' Visual Performance Laboratory, Professor Frank Schieber is using ASL's eye tracking system in studies to assess adult age differences in the legibility and visibility of highway signs. Another line of research is attempting to characterize the differences in visual information available in nighttime versus daytime driving scenes.

"Most recently, we have been conducting research into the mechanisms mediating the 'conspicuity' of fluorescent colored highway signs as well as kicking around some interesting ideas regarding a simple but potentially powerful model for understanding the 'appearance' of fluorescent colored materials," reports Schieber.

ASL's EYEHEAD Integration with Ascension's Flock of Birds tracker is well-suited for use even in metal rich environments such as automobile and aircraft simulators. With it, gaze points can be tracked and recorded accurately—within about 1 degree visual angle—on multiple scene planes. This Windows-based system instantly identifies and records up to 20 eye targets, distances, X-Y coordinates, and pupil diameter for real-time monitoring and analysis.

The EYEHEAD environment consists of the Flock of Birds transmitter and up to 20 surfaces of interest. In a vehicle simulator, for example, surfaces might include the instrument panel, center console, rear view mirror, side mirrors and "out the window" display. Each surface is assigned a coordinate frame. Point of gaze is specified as a scene plane number as well as a horizontal and vertical coordinate with respect to that surface. ASL's standard system reports these values 60 times per second, but higher speeds are also possible.

Both the University of Calgary and the University of Illinois Beckman Institute use the EYEHEAD system for research in Globalsim car simulators. The University of Massachusetts uses EYEHEAD Integration to develop manufacturing tutorials and pursue a broad range of visualization studies.

With the recent formation of a strategic alliance between ASL and Ascension, ASL now exclusively markets Ascension's magnetic motion trackers as the magnetic tracking solution in their head and eye tracking products. These systems are fully integrated, and for studies such as these driving visualization projects, integration means the researchers can acquire their data more quickly and attend to the science of their studies more effectively, start to finish.