Argus Science ET3Space

for ETServer Head Mounted Eye Trackers

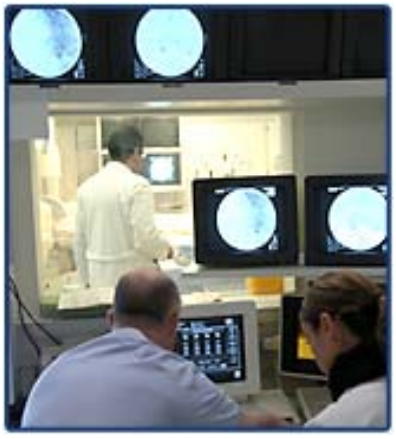
Eye and Head Position

Argus Science offers a turnkey solution for conducting research in complex environments with multiple stationary surfaces, such as driving or flight simulators. To quickly compute real time gaze on multiple surfaces, our exclusive *ET3Space* package accurately combines eye and head position data obtained from our versatile *ETServer* eye tracker and an integrated head tracking motion capture device.

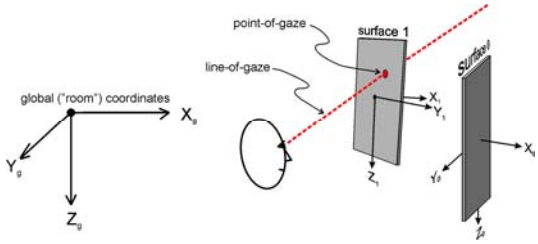
The Eye Tracker provides gaze direction with respect to the head and the integrated motion capture device provides head position and orientation with respect to the environment.

3 Space Environment and Data

ET3Space software calculates point-of-gaze on up to 20 surfaces of interest. Typical surfaces include monitor screens, keyboards, instrument panels, poster displays, walls, floors, etc. Several methods, including use of a laser-pointing device, are available for quickly and easily specifying surfaces of interest to the *ET3Space* software.



The data reported by *ET3Space* includes head position and orientation, position of the eye and direction of the gaze vector in environment ("room") coordinates, identification of the surface being viewed, the coordinates of the gaze point on that surface, and pupil diameter. Data are displayed in real-time, can be streamed to external devices in real-time via Local Area Network, and can be recorded on a digital data file. Real-time point-of-gaze can also be displayed on the video image from a stationary ("room mounted") camera.



Typical applications include gaze tracking in driving and flight simulators with multiple instrument panel surfaces and "out the window" display screens; control rooms with multiple monitors or instrument panels; and environments that require participants to move about amid various objects or obstacles.

Head Tracking

Argus Science eye trackers are compatible with a variety of motion capture devices that can be used as the *ET3Space* head tracking component. Systems from many leading companies are supported, including NDI, Advanced Realtime Tracking (ART), Vicon, Qualisys, Polhemus, and others. From the list of supported devices, and with individual help from engineers at Argus Science, the user is

free to choose the motion capture technology that best meet the needs of a particular environment and application.

Advantages

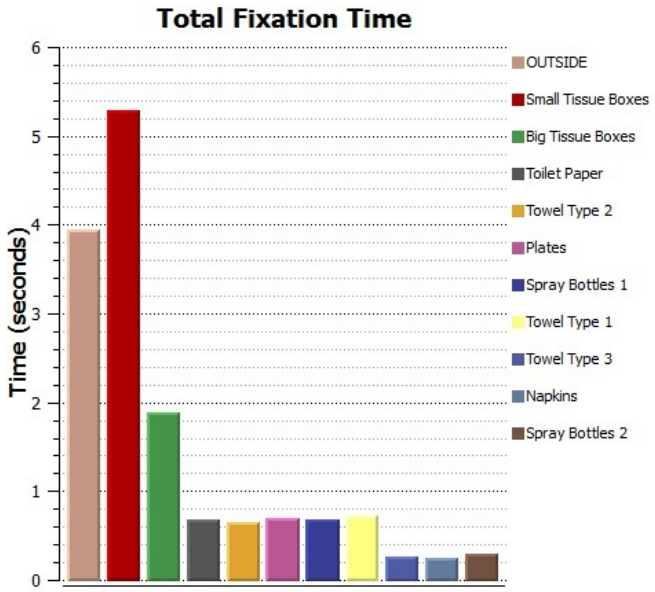
What are the advantages of the ASL system when combined with motion capture devices?

- ***Computes the locations of the gaze vector in true 3 dimensional space in real time***
- ***Determines gaze point on multiple screens or surfaces, whose location, orientation and boundaries are known in true 3 D space***
- ***Surfaces are easily specified to the system using a pointing device (3 points define a plane)***
- ***Real-Time data available via LAN***
- ***Displays real-time point-of-gaze on the video image from a stationary ("room mounted") camera***
- ***Data conveniently analyzed by ETAnalysis***

Data Analysis

ET3Space data is quickly analyzed with Argus Science *ETAnalysis* software. *ETAnalysis* is designed to process and analyze data collected with Argus Science eye trackers. It can be used to:

- ***examine and plot raw data***
- ***associate scene images with sections of gaze data***
- ***define areas of interest on images***
- ***reduce gaze data to fixations as well as "dwells"***
- ***display data graphically***
  - ***time plots***
  - ***X/Y scan plots superimposed on scene image***
  - ***heat map plots on scene image***
- ***combine results across trials or subjects by averaging statistical data from each or by pooling the original data***
- ***export results in Excel or ASCII text format for further custom analyses***



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