



# Argus Science *ETServer*

## Eye Tracking System

### ETServer

The *ETServer* system is especially suited to applications requiring precise, high update rate, point-of-gaze or pupil diameter measurements under very flexible conditions in indoor environments. Data update rates from 60 to 360 Hz are supported.



Both head mounted and chin rest mounted optics are available.

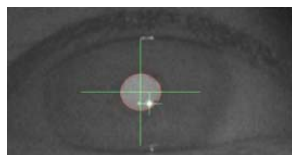
Optics are connected to a desktop PC containing all eye tracker electronics. Bright pupil optics provide optimal eye feature contrast for indoor conditions, and sophisticated image processing algorithms find the eye features automatically and accurately to compute line-of-gaze and pupil diameter.

An ellipse is fit to the pupil image outline so that, as the eye rotates, apparent changes in ellipticity of the pupil image (a circle appears elliptical when viewed from an angle) do not affect either the pupil diameter measurement or the accuracy of the pupil center determination.

Optics connect to the *ETServer* PC with a standard 15 ft. (4.57 meter) cable, or custom cable up to 50 ft. The system is ideal for either seated participants or participants who will walk about in a limited area.

### Convenient and Accurate Outputs / Displays

*ETServer* eye trackers provide constant feedback indicators superimposed on both the eye and scene images, allowing the operator to monitor the status and quality of measurements.



A digital recording of the eye and scene images, with feedback indicators, can be created as a permanent record.

Recorded data include gaze position, pupil diameter, and external event markers.

Data files recorded by *ETServer* automatically include participant calibration data as well as all eye tracker set-up, parameter, and configuration information.

Real time data can be streamed to external devices via local area network (LAN) connection.

### Head Mounted Optics (ET-HMO)

Head mounted optics are attached to a lightweight adjustable headband, and have adjustments with multiple degrees of freedom, including an infra-red reflective beam splitter mounted on a flexible wire. The small beam splitter directs the eye image to the camera, allowing the camera to view the eye from many different angles. This enables the system to accommodate participants wearing eyeglasses of different types, or situations where the primary field of view may not be straight ahead. Use of the beam splitter means that the eye camera never occludes the field of view, and peripheral vision is completely unobstructed.

Gaze is determined with respect to either the image from a head mounted scene camera; or, if the *ET3Space* feature is used, with respect to a real world 3 dimensional coordinate system.



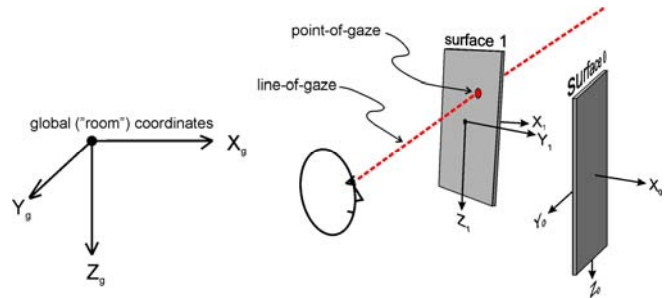
The standard (60 Hz) head mounted optics unit weighs 12 ounces (339 grams), and can be comfortably worn by participants 4 years and older. With the high-speed option (120/240/360 Hz), the unit weighs 14 ounces (395 grams).

### Chin Rest Mounted Optics

Optics can be provided on a chin and forehead rest assembly that clamps to a tabletop. In this case, the optics assembly can be equipped with a precision focusing mechanism to allow very accurate measurement of absolute pupil diameter as well as gaze direction.

## ET3Space

When head mounted optics are combined with an optional head tracking device and Argus Science's *ET3Space* software package, the system can measure a participant's gaze with respect to stationary surfaces in the environment. Up to 20 different surfaces can be defined.



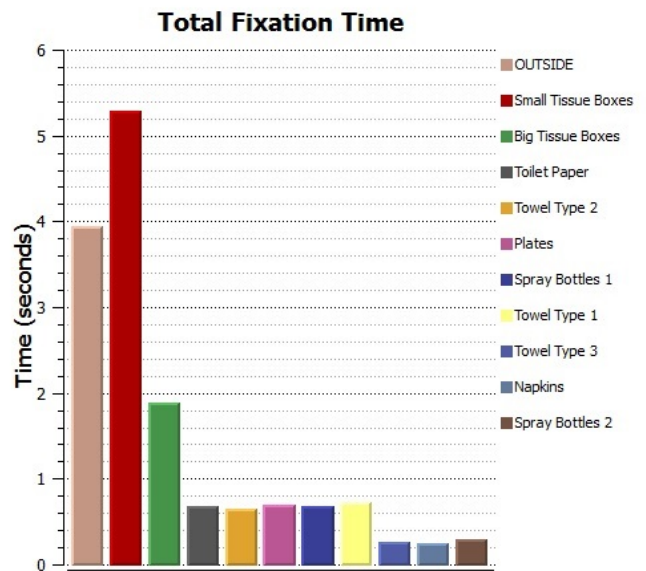
*ET3Space* data include the position of the eye and the direction of gaze with respect to 3-D room coordinates, the identification number of the surface being viewed, point-of-gaze coordinates on the surface, distance from the eye to the point of gaze, and pupil diameter.

The head tracking information needed for *ET3Space* can be provided by many commercially available tracking devices (see separate *ET3Space* brochure for more details).

## 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**



Key Advantages

- Incredibly fast and simple setup.
- Optimal ergonomics with a comfortable and secure adjustable headband.
- Head mounted optics do not obscure the participant's field of view. The adjustable optics provide the flexibility needed to capture a wide variety of participants over multiple viewing areas and conditions.
- Quick and easy calibration of participants.
- Automated features with manual overrides for challenging participants.
- Eye and scene images displayed with real time feedback (as a point of gaze cursor on the scene image and feature recognition indicators on the eye image).
- A broad choice of methods for capturing the scene image including a head mounted scene camera and, when using the Argus Science *ET3Space* feature, a remote (room fixed) scene camera.
- Communication with external devices via local area network (LAN), including communication with Argus Science's *ETRemote* app to send or record screen content and data.
- A standard 15 foot cable connecting the optics to the ETServer PC, with custom configurations available up to 50 feet.

Specifications:

Sampling Rate	60Hz (High Speed: 120, 240, 360 Hz)
Measurement Method	Pupil-Corneal Reflection
Accuracy	0.5° Visual Angle
Resolution	0.1° Visual angle
Visual Range (with respect to head)	50° Horizontal 40° Vertical
Real Time Data Outputs	Horizontal & Vertical Gaze Coordinates and Pupil diameter
Distance from participant to ETServer PC	Standard 15 ft (4.57m) cable from ETServer PC to optics. Custom lengths are available.



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