

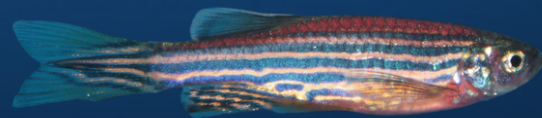
Created in 1990

More than 30 years of experience Worldwide

**ViewPoint** 

Zebrafish & other aquatic species  
behavior solutions

NEUROSCIENCE AND ECOTOXICOLOGY



  
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# 01 INTRODUCTION

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## PRECURSOR OF AUTOMATED BEHAVIORAL ANALYSIS

The company was founded in 1990 and has grown into a major player in behavioral research solutions. In 2001, the first commercial behavioral enclosure for zebrafish, the ZebraBox was developed in collaboration with Harvard University.

Our solution provides access to high throughput screening, reliable data, improved cost efficiency and groundbreaking studies.

ViewPoint is currently recognized as an industry leader and is the go-to resource for top scientists looking for reliable video tracking solutions.

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## 02 ZebraLab

HIGH THROUGHPUT  
MONITORING  
OF FISHES

### ZEBRALAB SOFTWARE

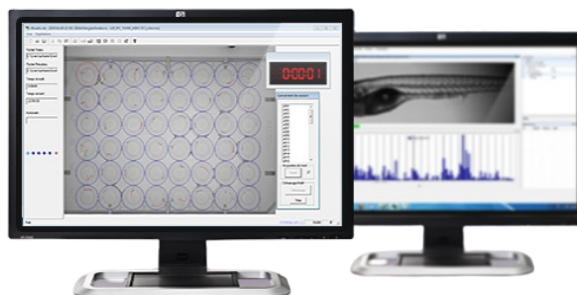
ZebraLab is an “all-in one”  
powerful tool to measure  
Behaviour of fish.

## ZebraLab

AUTOMATED FISH BEHAVIOR ANALYSIS SYSTEM



ZebraLab software can analyze very small subjects such as embryos or bigger such as larvae or adult fish. It is suitable for research in drug development, safety pharmacology such as cytotoxicity, behavioral genetics, learning and memory, circadian rhythmicity and other. It can be used for very high-throughput behavioral applications scoring of locomotion, activity, responses to stimulation or conditions and specific behavior. Easy to parameter, ZebraLab analyse up to 96 larvae per box and 384 with the same ZebraLab licence.



## Various fields of application:

- Animal behavior analysis
- Safety Pharmacology
- Toxicology and Eco-Toxicology
- Drug Screening and Drug Development
- Behavioral Genetics
- Seizures
- Circadian rhythmicity
- Light response and Vision tests
- Escape response C-Stat, S-start
- Muscle disorder/ Muscle recovery
- Ethology
- And many other applications ...

# ZebraLab

HIGH THROUGHPUT  
MONITORING  
OF FISHES

## ZEBRALAB SOFTWARE

ZebraLab is an “all-in one”  
powerful tool to measure  
Behaviour of fish.

# ZebraLab

AUTOMATED FISH BEHAVIOR ANALYSIS SYSTEM

ZebraLab processes several tasks at the same time while running your behavioral analysis. Multiple behaviors can be analyzed. Just pick the one you need. ZebraLab wizard helps you step by step to adjust your protocol parameters. It is the cutting edge of behavior analysis; it is an easy to use and high throughput system able to automate almost all behavioral tests known for fish. In a few simple steps of set up you are able to analyze several animals simultaneously, live or using the videos you already recorded in the past. Using our system will save your time, increase your productivity and accelerate your manipulation in order for you to focus on your interest with very precise data.

- **Locomotor behavior** : classification of locomotion states via distance travelled, speed...
- **Activity quantization** : classification of activity states (freezing, burst)

## Key features

- Reliable data & perfect tracking in multi-well plates
- Total control of automated experimental conditions
- High throughput analysis of zebrafish
- Cost-effective & easy to use
- Expandability & customization
- Replay and reuse your data

## Available analysis extension

- Rotation and histograms
- Social contact
- Juvenile sizing
- Cardio vascular screening
- High speed behavior (escape response)
- Multitracking and shoaling behaviors

## 03 ZEBRALAB EXTENSION

ZebraLab Core 2 allows multiple analysis to be performed at the same time. Simply select from a list of options the different parameters you would like to score. Our protocol creation wizard will assist you throughout the setup of your protocol. It will automatically place the areas of interest and apply the different defined conditions to all the locations to be scored in a few clicks.

### Groupe screening:

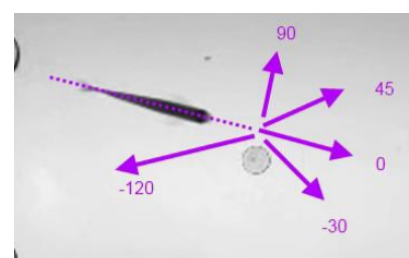
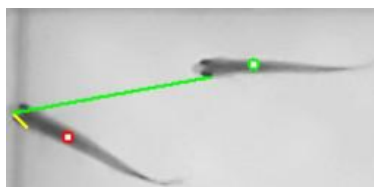
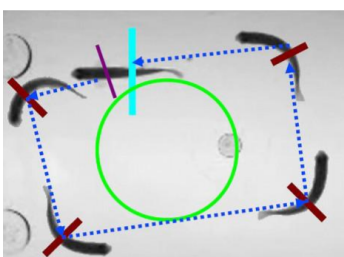
Upgrade of the ZebraLab system for group screening including :

- Extended analysing system to increase the number of animals analysed simultaneously in the same tank
- Classification of the group behaviors within histograms
- Count of the number subject in each area throughout the test

### Shoaling Analysis:

Group locomotion tracking of different subjects in the same region :

- Behaviour analysis of subjects
  - Speed distribution
  - Acceleration distribution
  - Average Speed
- Group behaviour analysis
  - Inter-individual distance (Mean distance from each subject to all others)
  - Nearest neighbor distance (Mean Distance between the subject and its nearest neighbor)
  - Polarization (Magnitude of the mean vector of all subjects)



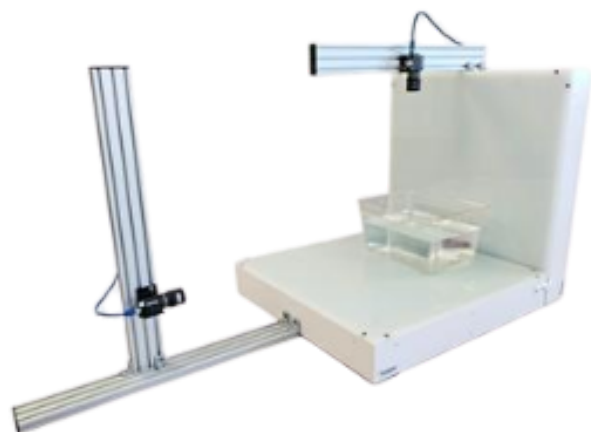
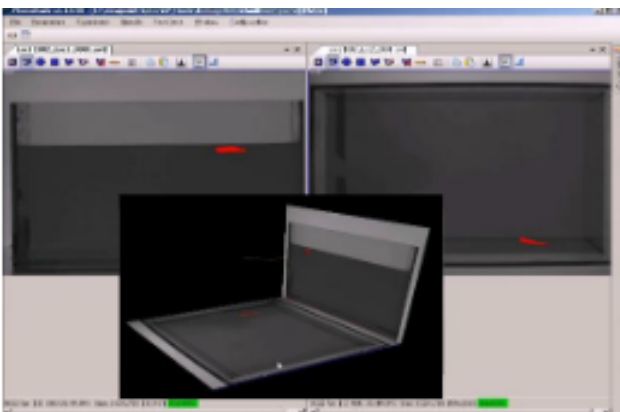
# ZEBRALAB EXTENSION

## ZebraLab GrandView - Live 3D tracking

### ZebraLab Extension

Live 3 Dimensional (3D) tracking of fish in tank :

- Real 3D analysis; Live reconstruction of (X; Y; Z) position of the animal
- ZebraLab extension to handle two synchronized cameras
- High Resolution Analysis
- Automated Locomotion monitoring and calculation
- Data analysis in real time
- Automatic stop of the experiment
- 3D Locomotor behavior
- Replay of the experiment as you desire



## 04 ZebraBox

ZEBRAFISH EMBRYO  
AND  
LARVAE RESEARCH

The first ever observation  
chamber designed  
for zebrafish observation  
since 2005

## ZebraBox Revolution

AUTOMATED FISH BEHAVIOR ANALYSIS SYSTEM



Since first developed in 2005, the ZebraBox was the first observation chamber designed for zebrafish observation. The 4th generation of ZebraBox is the result of 15 years of close collaboration and development with zebrafish researchers. Unlike other systems inspired from the ZebraBox, the subjects are in direct observation, without the use of fresnel lens which can create heat, condensation, image distortion and ultimately stress to the subjects.



### Control of the experiment conditions :

- Double anti-vibration systems
- Cold light control
- Strong light stimulation
- Direct observation technology
- Soundproof

# ZEBRABOX REVOLUTION

Automated observation chamber for zebrafish larvae and embryos

## ZebraBox Revolution

The Zebra Box is a complete system, designed for the high-throughput analysis of zebrafish larvae in multi-well plates with a total control over the experiment environment.

The ZebraBox combined with Zebra Lab Software allows the automated observation on multiple Zebrafish larvae and embryos.

The ZebraBox is capable of analyzing zebrafish larvae in multi-well plates, up to 96 individuals simultaneously. ZebraBox can revolutionize your research thanks to its scalability: up to 4 ZebraBoxes can be installed in parallel, allowing the state of the art in high-throughput screening.

### Key Features :

- Total control of the experiment conditions
- Automated observation and tracking of larval zebrafish
- Multi-well plates compatible, up to 96 individuals simultaneously
- Scalable and versatile system
- Reliable and reproducible data
- Fast data processing for time saving

### Available add-ons:

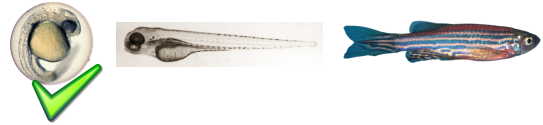
- Temperature control - not required for short term experiment ( less than 10h)
  - Controllable vibration and sound
  - Shocker
  - Photomotor response
  - Optogenetic
  - High speed camera
  - Monochromatic color and UV light
- ...and more to fit your specific research needs!



# ZEBRABOX EXTENSION

Automated observation chamber for Zebrafish, larvae and Embryos

## ZebraBox Extension Photo motor response



ZebraBox upgrade to trigger Photo Motor Response in micro plates, according to David Kokel protocol, including:

- ZebraLab software extension for High Intensity Light Source.
  - Projection of high intensity light source on top of the Zebra fish
  - Monitoring of the fish response to the stimulation
  - Control of light sequences
- ZebraBox PMR Plug-in
  - Verticalized High Intensity Lighting system
  - Controllable high power light source : 0 to 40000 lux
  - Infrared sensitivity independent of the light stimulation
  - Data synchronization according to light status
- Controllable High Power Light intensity: 0 to 40 000 Lux
- High-Resolution camera
- White Light temperature: 8000 to 10000 Kelvins
- Power supply integrated in the ZebraBox



## ZebraBox Extension

Top Light modules : Optogenetic : 2 or 3 colors / Real Color

Use light to modulate molecular events in a targeted manner in living cells or organisms. ZebraBox upgrade to trigger light stimulation in micro plates, including :

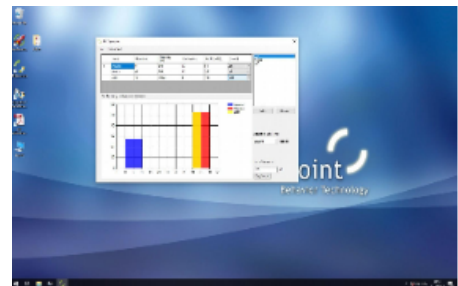
- Control of light sequences and intensity
- Several wavelength possibilities
- Monitoring of the fish response to the stimulation

## 05 High Speed & PPI SETUP

## ZebraLab for PPI test



PPI Backed by years of research and development, ZebraBox Revolution brings state of the art observation and video tracking to your laboratory. A special device synchronizes the stimulus and the camera frames to allow an accuracy under 1 millisecond ! The ZebraBox is designed to have a perfect synchronization of the sound stimulus over every well (less than 100 $\mu$ s).



**Complete turnkey fast behavior apparatus system for high speed applications for Zebrafish including:**

- ZebraLab “Lightning Fast” software
- Two step analysis: time controlled acquisition and batch processing to detect multiple animals.
- PPI Generator application:
  - Sound calibration
  - Stimulus sequence definition
  - Acquisition workflow management
    - Batch Processing, data analysis:
  - Distance swam
  - Displacement
  - S & C shape,
  - Time to reaction, latency
  - Response type classification: scoots turn
  - Angle bend and amplitude
  - Trajectory, Distance swam, Displacement
  - Latency type: LLC (long-latency C-start) /SLC (short-latency C-start)

## 06 ZebraTower

FAST  
HIGH SPEED ADULT  
FISH MONITORING

### ZebraTower

AUTOMATIC ADULT FISH  
MONITORING



Using our fast cameras technology, you can automate any kind of test involving refined behavior analysis such as social contact and aggressive behavior in various tank shapes.

### several applications:

- Zebrafish 3D tracking
- Sizing assay of zebrafish
- Sizing in zebrafish

### ZebraTower system includes :

- Camera : high sensitivity - up to 30 frames/sec acquisition board
- Openfield with Infrared Lighting module 50\*50cm
- Camera stand

### Specification of ZebraTower:

- Infrared Lighting system:
  - For a precise detection of the zebrafish
  - Camera will only be sensitive to this infrared light source
- Fast camera with high sensitivity
  - Live analysis at 30 to 100 Frames /Sec
  - Up to 200 Frames /Sec at 640 X 480 (offline analysis)
  - Up to 300 Frames /Sec at 320 X 240 (offline analysis)
- ZebraLab software extension for adult analysis
- Appropriate lens for sharp picture quality
- Acquisition board
- Camera stand to hold the high speed camera

## 07 ZebraCube

LARGE ENCLOSURE  
BEHAVIOR CHAMBER

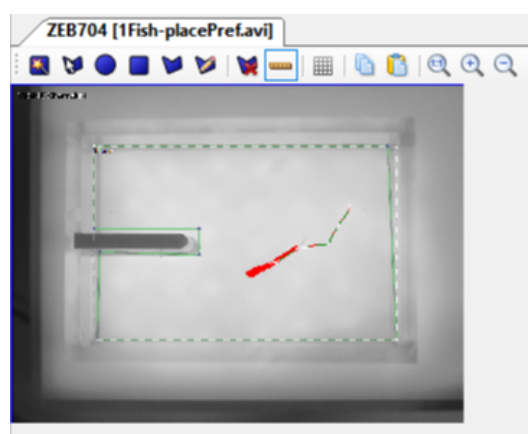
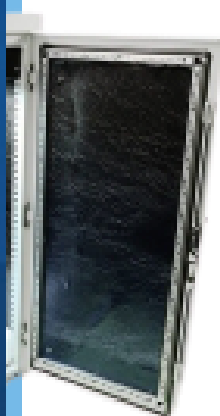
All in one cabinet for  
adult Zebrafish  
experiments

## ZebraCube

COMPACT CABINET FOR ADULT ZEBRAFISH SCREENING



ZebraCube is similar to the ZebraBox, it is an enclosure to monitor and score adult Zebrafish behavior under controlled condition for large tanks or multiple dish.



## Total control of the experiment conditions

Controlling the environment during a behavioral experiment is the key to success. ViewPoint has developed a new Cubicle enclosure to control **light** and **optionally sound** and **vibration**.

Zebbralab can monitor up to 4 Cubicles to analyse up to 64 subjects.

# 08 VISIOBOX

## Automated Visual Response Analysis

### VisioBox

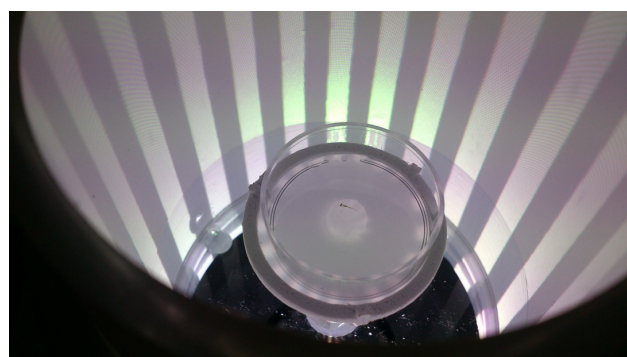
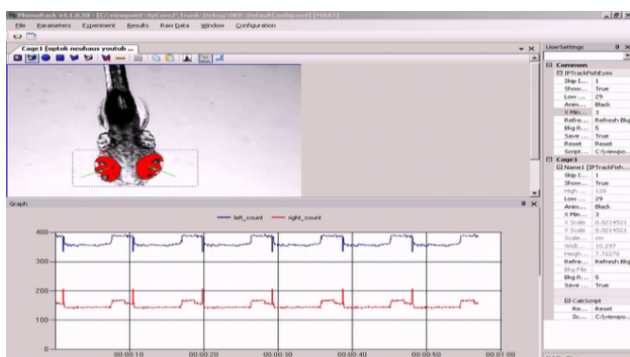


VisioBox is a fully automated high-throughput system for automated analysis of the visual oculomotor performance of larval fish. Optokinetic Response (OKR) ViewPoint's VisioBox system includes everything you need from hardware to software to run an Optokinetic Response test on 5 larvae simultaneously.

#### Oculomotor performance :

Define a specific environment projected around the larvae using the ZebraLab software.

- Get full control and adaptability of the zebrafish
- Environment and behavioral responses
- Adapt the environment to the subject's behavioral responses
- Dig deeper into your behavioral paradigms
- Eyes behavior of Zebra fish in response to the stimuli
- Differentiate eyes Slow Phase Velocity (SPV) AND Fast Phase Velocity (FPV)



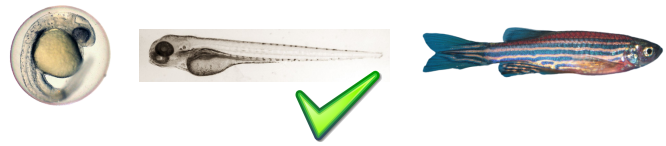
# 09 Micro - ZebraLab

## CARDIOVASCULAR MONITORING AND BLOODFLOW

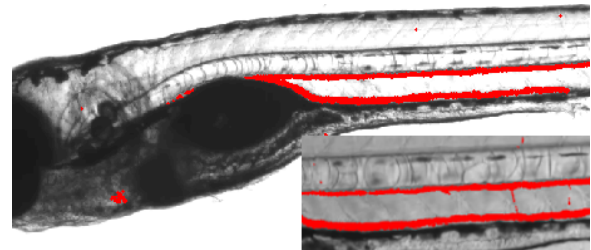
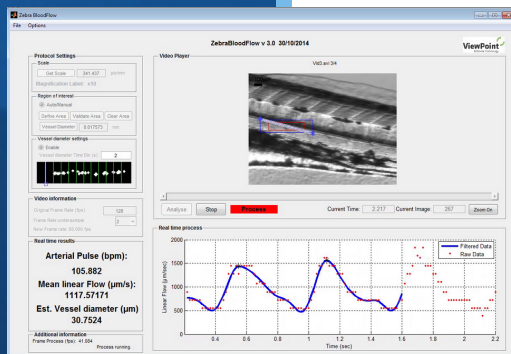
Zebrafish  
Cardiology and Physiology

## Micro-ZebraLab

HEART BEAT AND BLOOD FLOW ANALYSIS



MicroZebraLab is the reference tool since 2008 to investigate live and in a non-invasive way a scope of zebrafish embryo and larvae physiological parameters. Developed by ViewPoint from researchers' demand, it measures cardiovascular activity, gut transit and blood flow.



## Easily extract results

ViewPoint developed MicroZebraLab to bring high level of precision to cardiovascular data recording, opening up the possibility to zoom into greater detail: measure cardiovascular feature automatically such as heart-beat, flow rate, and the size of the blood vessel under the microscope without fluorescence or other markers, and easily extract results from your videos.

# MICRO-ZEBRALAB

## Cardiovascular monitoring and bloodflow

### Cardiology measurements of zebrafish larvae

Cardiovascular parameters are important to many studies, particularly when studying the effects of compounds or drug targets in pre-clinical phase. Having access to cardiovascular data enriches your dataset.

MicroZebraLab software enables to automate this task and various experiments involving movement of organs.

Zebrafish models are often used for high throughput screening, therefore data quantity greatly increased. When testing compounds as drug targets they often do not reach the pre-clinical stage due to cardiovascular effects. Detailed data on the cardiovascular system are extremely valuable prior to later stage mammalian studies. With high resolution and high-quality data in mind, MicroZebraLab has set new standards.

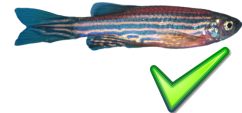
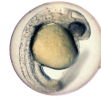
### Bloodflow and gut transit

In addition to heartbeat measurements, MicroZebraLab can measure automatically the blood flow or gut transit of your Larvae. Very easily and efficiently define the type of organ you wish to analyze and get instant results. No more hand scoring or use of time consuming labeling methods. Just place your fish under your microscope and get several physiological data on blood flow and gut transit.

# 10 Zebra Aggression Box

## Aggression Monitoring Tool on Juvenile Zebrafish

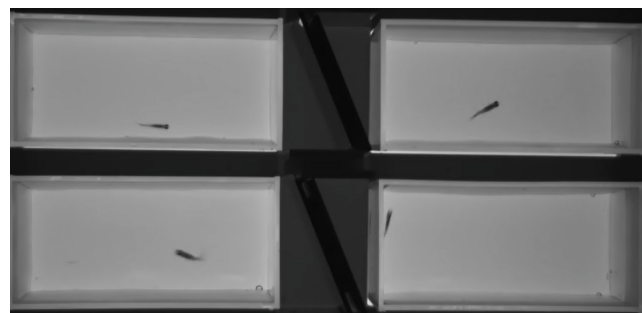
### Zebra Aggression Box



The Zebrafish Aggression Box is an observation system designed with our state of the art video tracking technology and a practical cubical to have a perfect detection of the fish aggression when the fish sees its own image towards a mirror.

#### Available for the applications:

- Controllable values
- Detect alterations to aggression levels produced by drug treatments or mutation
- Powerful screening technology - the drugs to reduce the aggression from the fish
- Scalable system – unlimited experimental fishes and cabinet to connected to speed up the research.
- Validated software - comparison to manual quantification

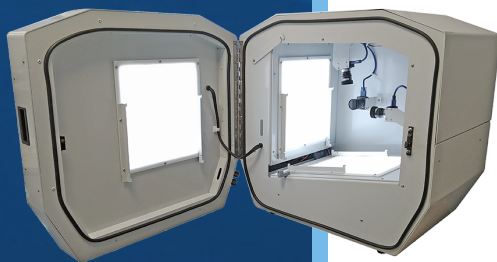


# 11 ToxMate Lab

MULTI SPECIES  
BEHAVIOR  
MONITORING TOOL

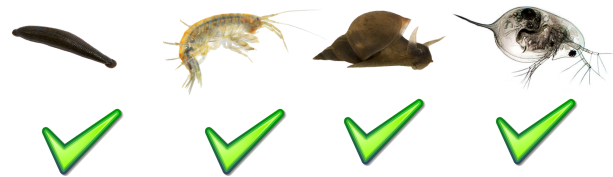
Online screening of  
bioindicators :

- Aquatic : gammarus, lymnea, radix...
- Terrestrial : spiders, mollusca...
- Airbornes : mosquitoes...



## ToxMate Lab

LONG TERM MULTISPECIES SCREENING



The ToxMate Lab is a brand new product developed by ViewPoint, able to perform long term and high throughput behavioral assessment in a controlled environment and high throughput behavioral assessment, up to 48 organisms tracked simultaneously in a controlled environment :

- White light source for stimuli/circadian sequences
- Thermo regulation via a temperature control unit
- Oxygen with a continuous water circulation



### BEHAVIOR ASSESSMENT

Detection of wide range of pollutants and recombined compounds



### MULTISPECIES

Detection of wide range of pollutants and recombined compounds

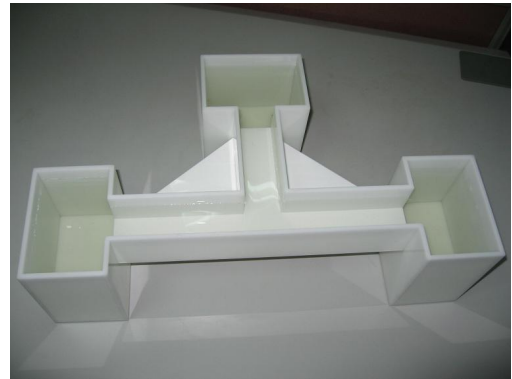


### CONTINUOUS MONITORING AND WATER FLOW

## 12 Other Hardware

### The Aquatic T Maze

The Aquatic T Maze to study cognition and learning behaviour for adult zebrafish is compatible with the ZebraCube. Made of a specific material, this maze is transparent to the infrared and allows to get an optimal detection of the zebrafish evolving in the 3 arms.



The T maze is designed with 3 tanks:

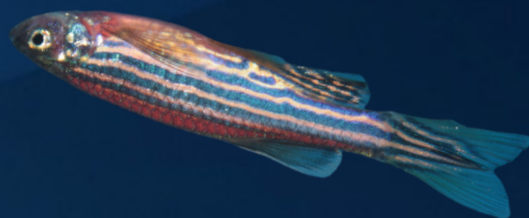
Total height: 50cm \* 30cm // Height 15cm

ZebraLab allow you to know the time spent, the distance traveled, visit numbers of each arm.

The temperature control unit facilitate internal temperature regulation in the experimenting arena. Requires for long term experiment- Over 10hours/

Long term experiments with water circulation system for ZebraLab system:

- Maintain constant temperature at 28 °C □ Temperature stability (°C) in the TCU:  $\pm 0.1$
- Pump and Tubing kit to connect to the ZebraBox
- Valves to set the output flow,
- Adapted Water tank
- Easy to read display
- High-quality bath tanks made of stainless steel with bath lid and drain tap Exhaust flow is gravity dependent; the control unit has to be installed underneath the bench



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