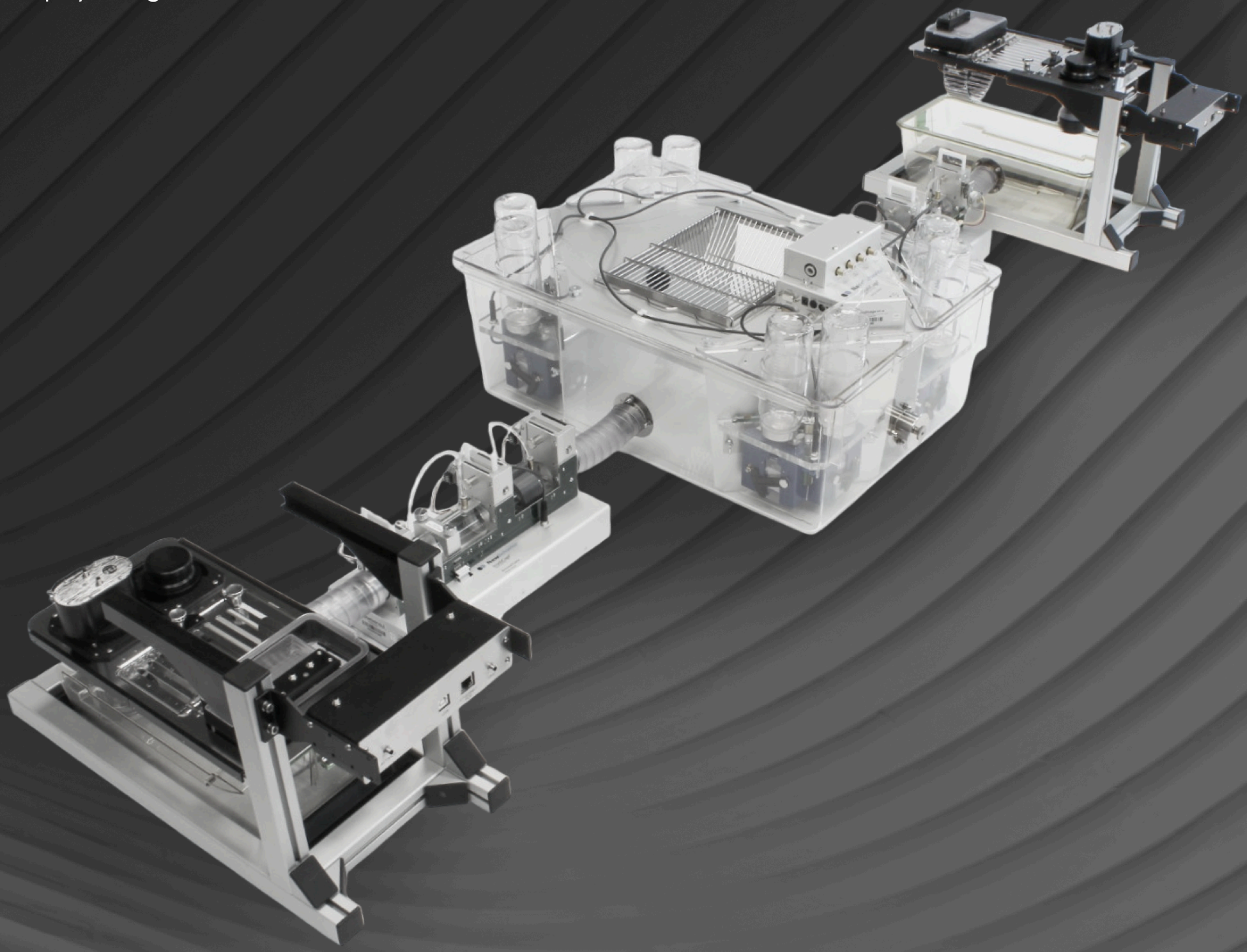
Unique solution

Key modules

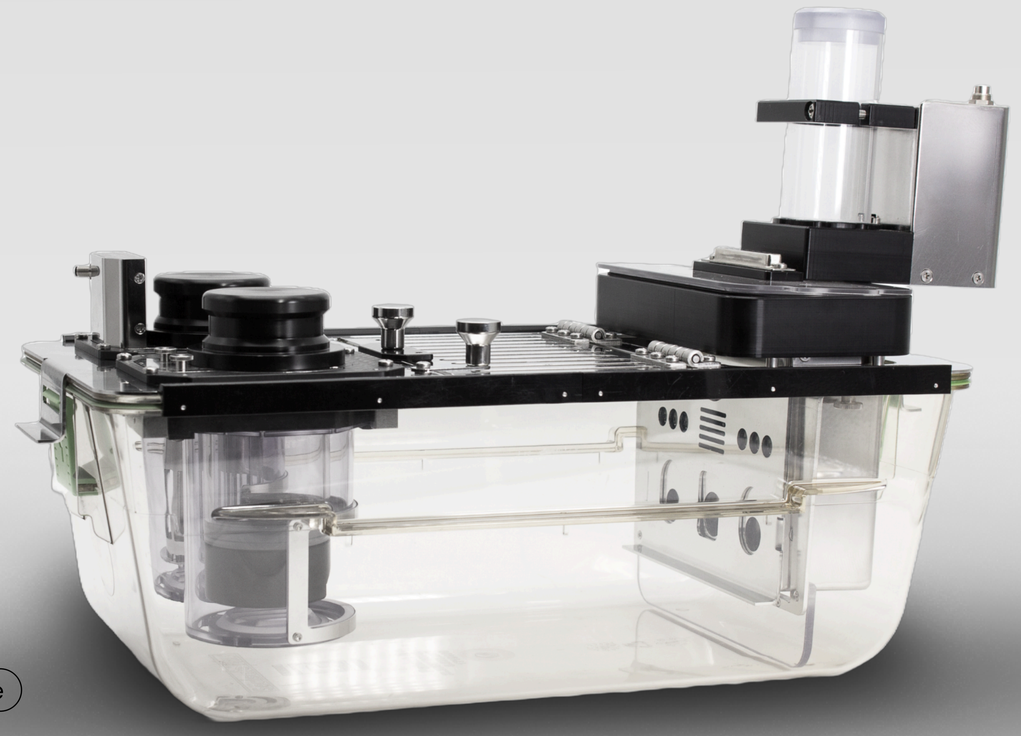
PhenoWorld

Revolutionizing Group Phenotyping in Rodents

Automated research solutions for
comprehensive metabolic, behavioral
and physiological studies



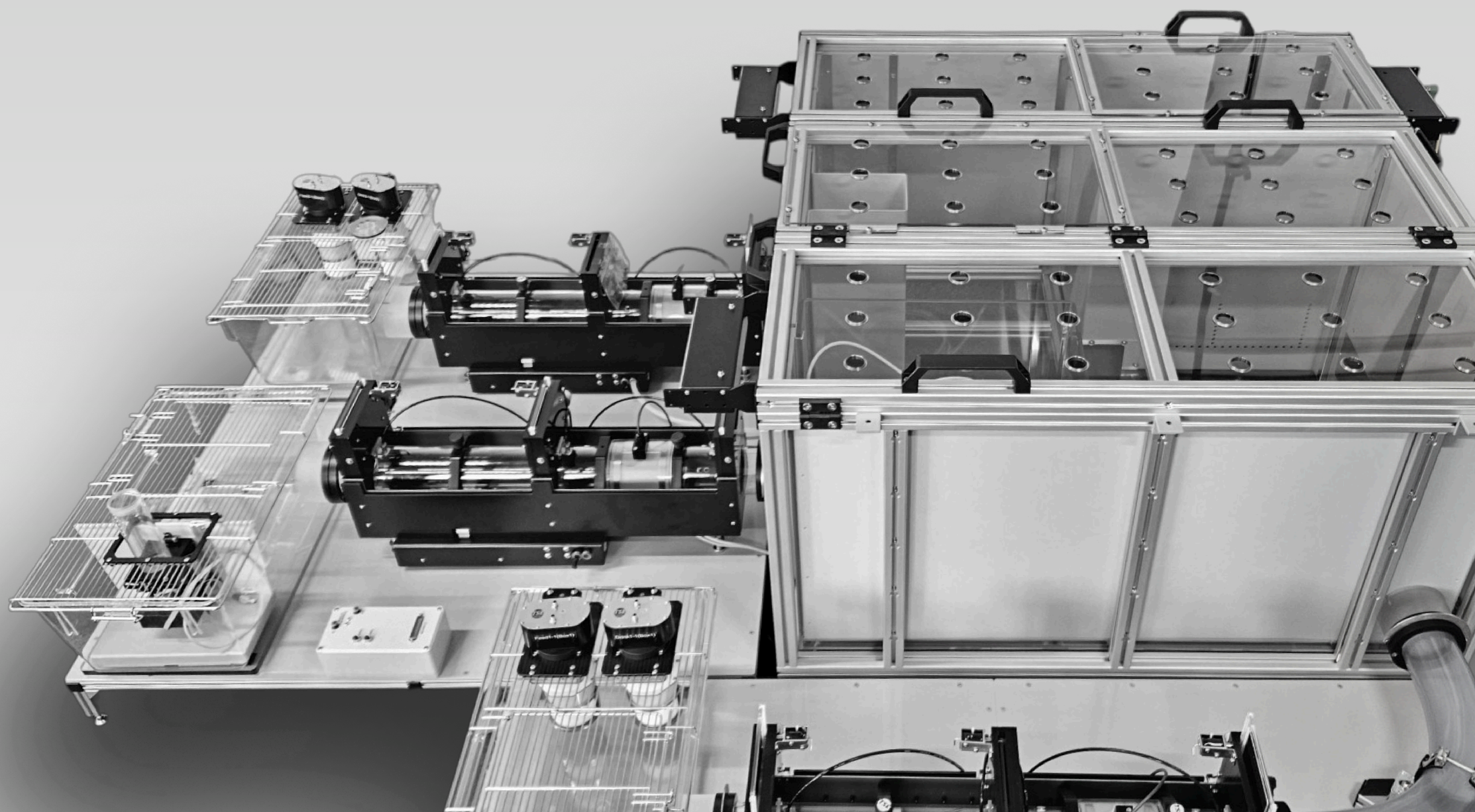
PhenoWorld: **Unlocking the Next Dimension of Rodent Preclinical In-Vivo Research**



Mouse Operant cage

Scientific breakthrough is fueled by an environment of curiosity, collaboration and technical advancements. We have engineered the PhenoWorld, a highly modular and automated ecosystem to fuel your research.

PhenoWorld allows a paradigm shift in rodent research: **from the limitations of traditional phenotyping to complex, translational studies** within an enriched, group-housing environment. Imagine moving beyond single-paradigm constraints to unlock truly multidimensional insights. PhenoWorld makes this a reality: it **integrates cutting-edge hardware, intelligent automation, and powerful analytics.** This synergy delivers unparalleled depth of data, empowering you to ask bold questions and answer them with unprecedented confidence.



Rat Social World

Unique Advantages

Social Housing

01

Animals live and interact in groups, producing data with high translational relevance.

Modular Flexibility

02

Easily expand your setup to new behavioral domains with arenas, modules and tools.

Minimal Stress

03

Automation and enriched environments result in lower stress, and high data quality.

Maximum Reproducibility

04

Automation, social environment and minimal stress allow unparalleled reproducibility of your research findings, even across laboratories.

Broad Applications

Cognition & Behavior

Metabolic Phenotyping

Physiology & Neurobiology

Translational Drug Discovery

Custom Paradigms



The PhenoWorld Concept & System Architecture

PhenoWorld's modular architecture empowers you to build the **perfect research environment.** Select from a range of sophisticated modules to create a system precisely tailored to your experimental needs, **enabling integrated behavioral, metabolic, and physiological phenotyping within social groups.**

Customize your own setup

PHENOMASTER CAGE

For metabolic phenotyping in the home cage, monitors food/drink intake, choice, activity and exercise. Can include indirect calorimetry with O_2, CO_2, CH_4, H_2, $^{13}C/^{12}C$ gas sensors.

INTELLICAGE

Enables automated cognitive and behavioral monitoring and phenotyping for individual rodents within social groups. Allows to run a battery of tests without human interference.

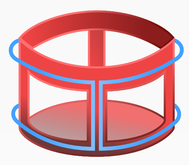
ANIMAL GATE

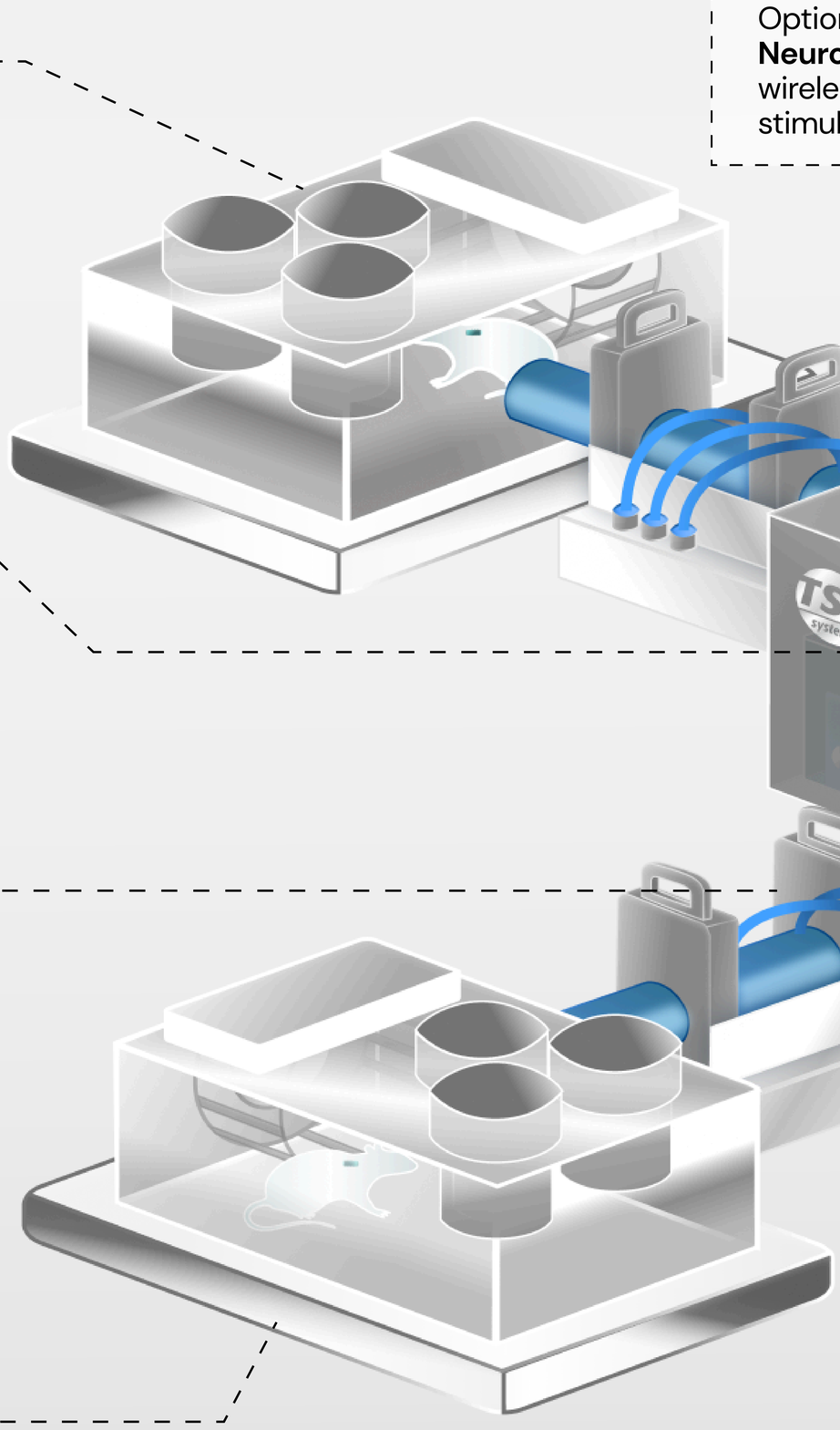
For controlled passage between the central IntelliCage arena and connected compartments. Automated doors, utilizing RFID antennas and infrared sensors, manage selective access for predefined individual animals.

ACTIVITY MONITORING FRAME

Provides up to 100 XYZ-axis read-outs using infrared light-beams for precise activity tracking.

Optional house **with NeuroLux** antenna for wireless optogenetic stimulation





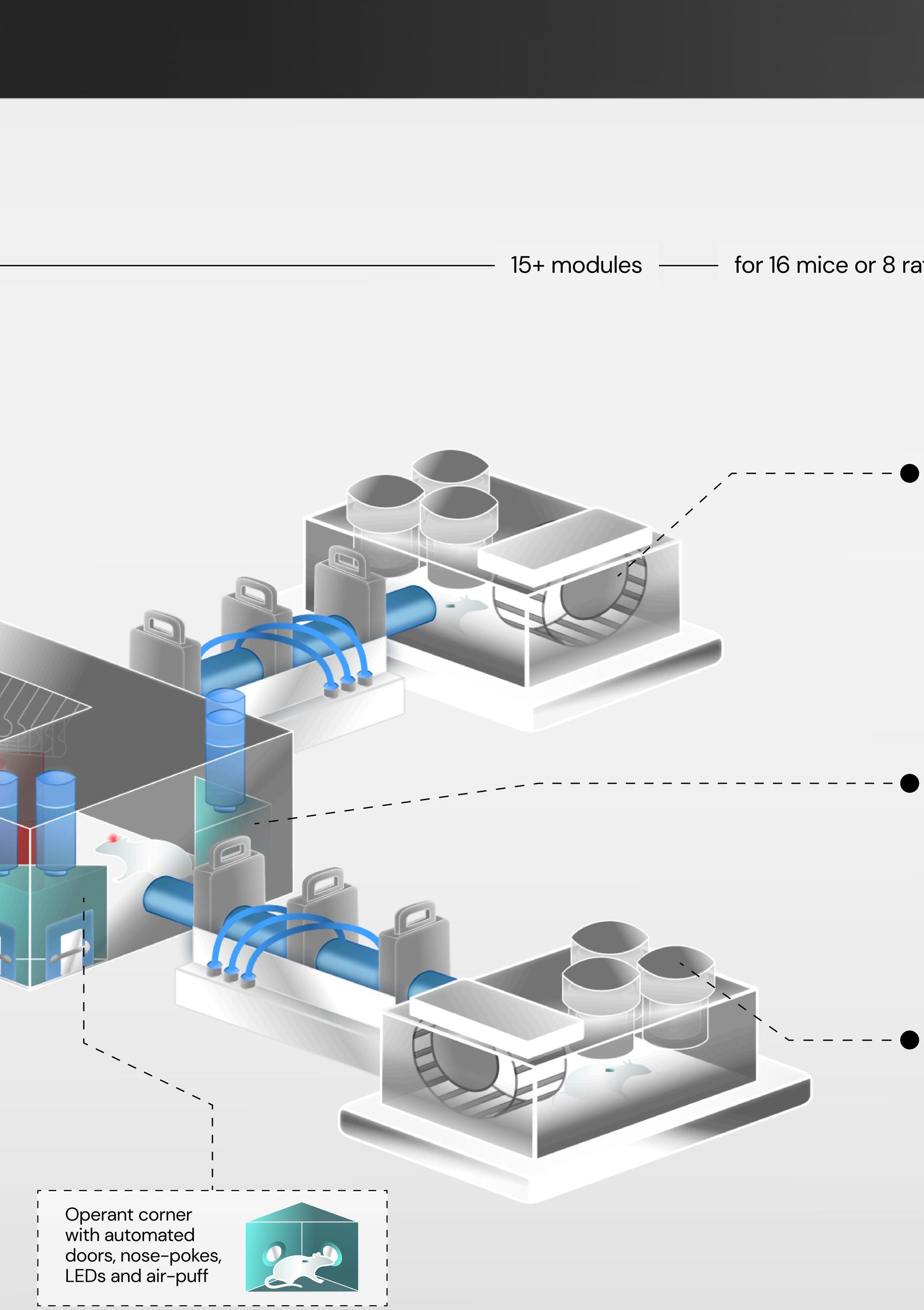
RFID Identification

PhenoWorld setups allow simultaneous testing of multiple animals, with numbers varying by setup size, up to colony housing

RFID transponders on each animal and strategically placed antennas (e.g., at module entrances/exits) ensure accurate individual recognition and data analysis.



15+ modules — for 16 mice or 8 rats — 24/7 monitoring



Operant corner with automated doors, nose-pokes, LEDs and air-puff

RUNNING WHEELS

Stand-alone or home-cage module for exercise testing. They can be set for voluntary activity and equipped with enable/ disable function. Specialized versions available for motor skill tests.

OPERANT CORNER

Equipped with nose poke holes and sensors, these corners allow individualized reinforcement and conditioning protocols, shaping animal behavior.

HIGH-PRECISION WEIGHT SENSORS

Continuously monitor food and drink intake, accommodating diverse diets. Modular access control units restrict consumption by time, duration, or amount.

Animal Gate

Up to four AnimalGates can be connected to each central cage, enabling the distribution of animals between various external arenas such as metabolic cage, exercise cage, mazes or other customized enclosure.

PRECISE TRAFFIC CONTROL

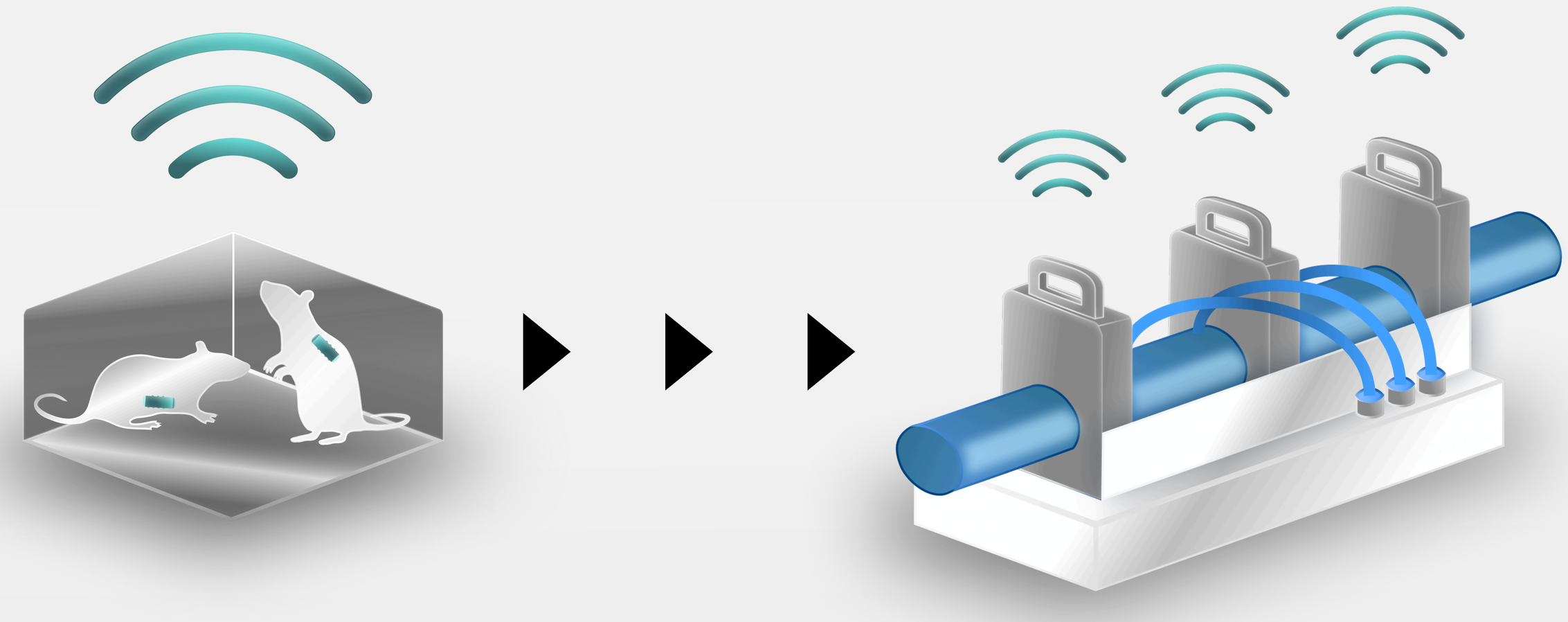
The light-beam sensors on 3 automated doors sense the direction of an animal's passage and distribute animals according to user defined directives.

INDIVIDUALIZED ACCESS

Antennas at the entrance recognize transponder-tagged animals, enabling selective access to specific compartments. If required, it can keep other mice away while selected animal performs tasks.

INTEGRATED BALANCE

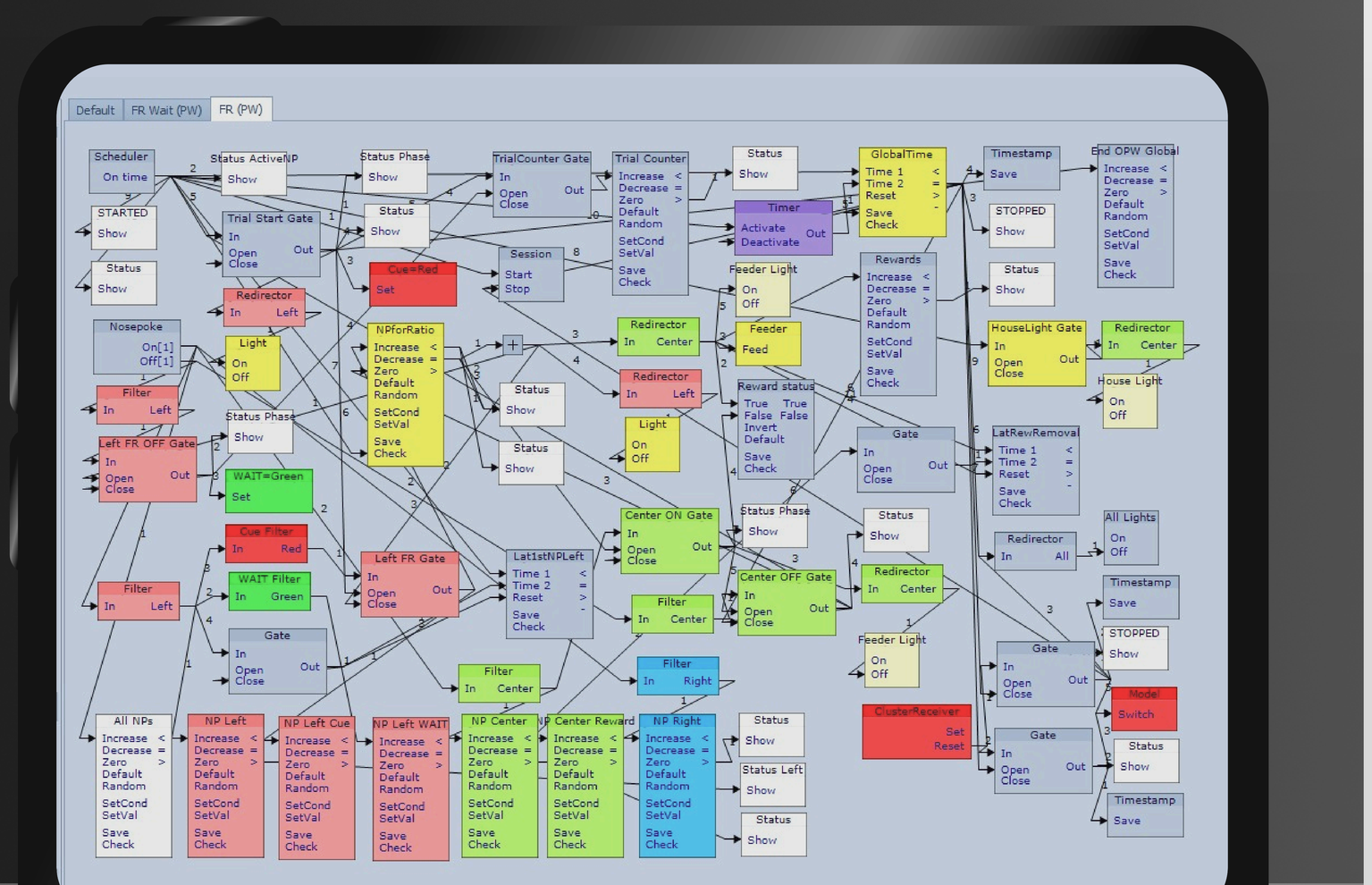
A built-in balance for mice allows for the precise measurement of individual body weight before food intake, which can also be used to monitor stress-induced or treatment-dependent weight changes.



Software

Advanced, integrative software with graphical experiment designer, robust analysis options, and seamless export to statistical packages.

PhenoWorld is built for reproducibility, efficiency, and scientific rigor at scale.



Optional Modules

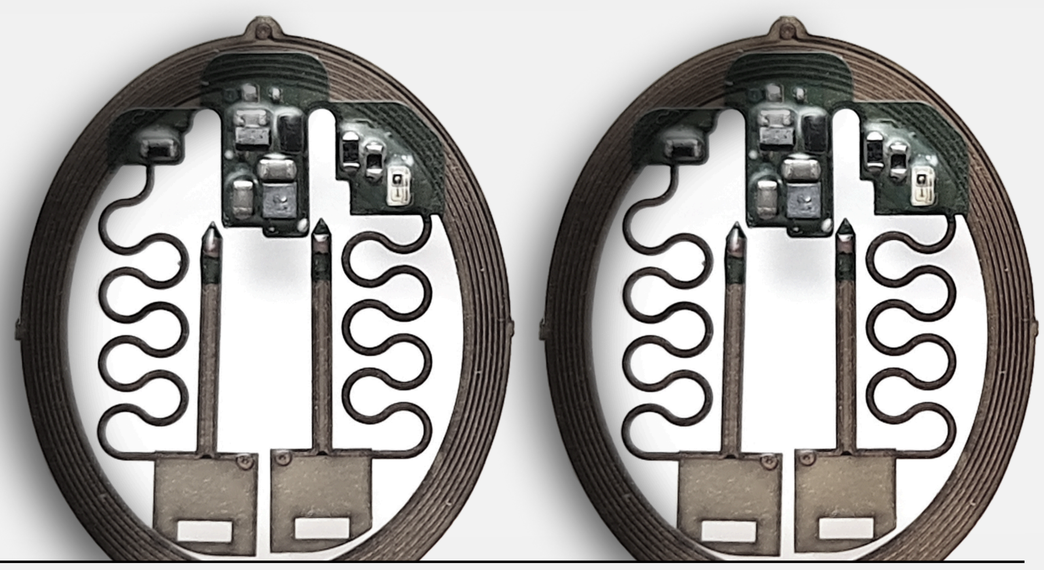
01 **OPERANT WALL**

An integrated into home-cage operant testing platform with food or liquid reward - ideal for extensive, long-term experiments. These adaptable units enable studies on motivation, attention, impulsivity, and learning. Also allows oral self-administration studies.



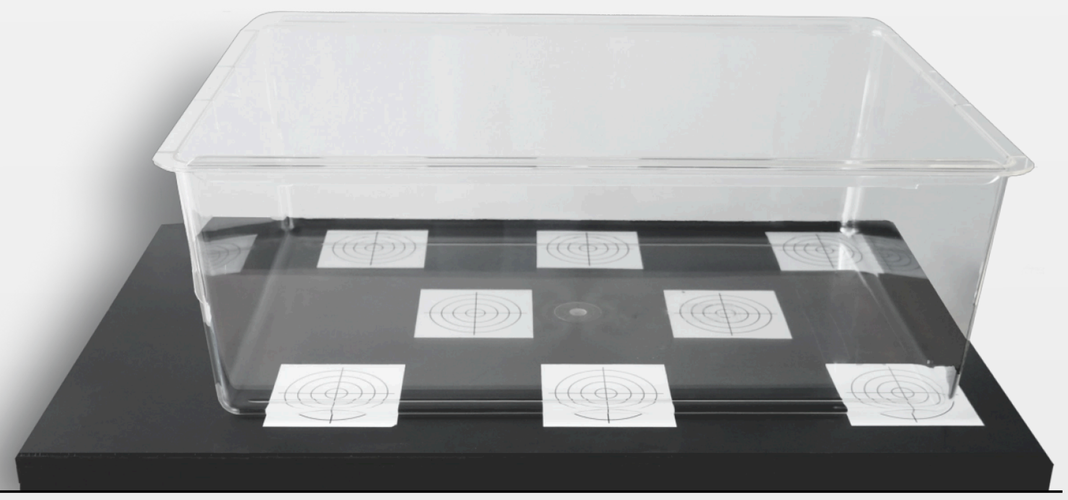
02 **PHYSIOLOGICAL MONITORING AND STIMULATION**

This module provides methodologies like optogenetic stimulation in targeted areas of system setup, real-time physiological monitoring of Heart Rate, Pressures, Body temperature and EEG, all in freely moving animals within your PhenoWorld setup.



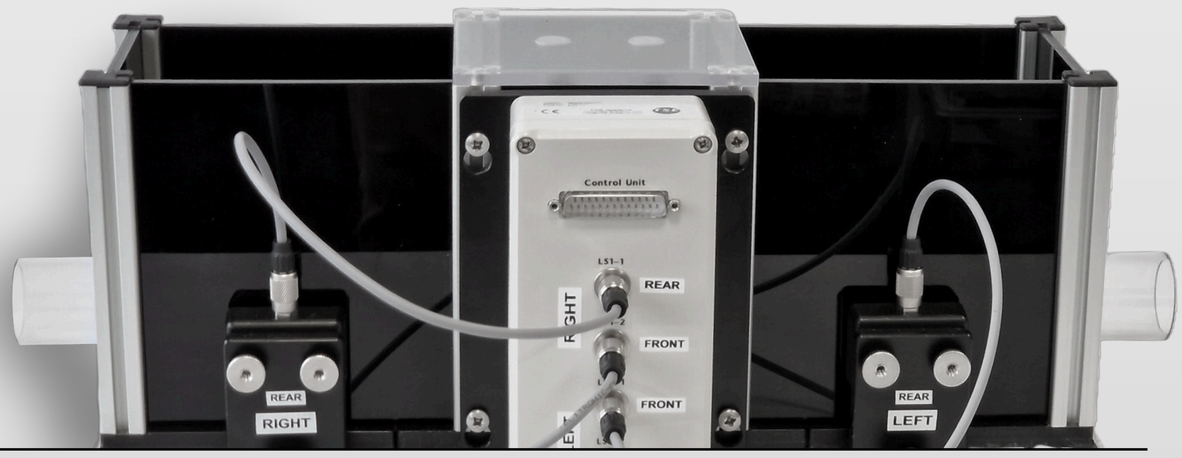
03 **TRAFFICAGE**

Provides high-throughput solution for circadian activity measurements. It automatically differentiates between active and passive animals within the same cage, making it ideal for large-scale. Up to eight floor-embedded antennas enhance efficiency and ease of use for continuous activity monitoring



04 **MAZES & ARENAS**

Various arenas, test system, or maze can be connected to central compartment via gates or tubes. Each compartment can offer unique functionality to evaluate a wide range of parameters, including social behavior, learning & memory, circadian activity patterns and decision-making within a single experimental setup.



Selected Publications:

- Leite-Almeida, H., Castelhano-Carlos, M.J., & Sousa, N. (2022). New Horizons for Phenotyping Behavior in Rodents: The Example of Depressive-Like Behavior. Frontiers in Behavioral Neuroscience.

- Eraslan, E., Castelhano-Carlos, M.J., et al. (2023). Home-cage behavior is impacted by stress exposure in rats. Frontiers in Behavioral Neuroscience.

- Fayad SL, Reynolds LM, Faure P. et al. (2024) Individualistic reward-seeking strategies that predict response to nicotine emerge among isogenic male mice living in a micro-society. PLoS Biol.

- Castelhano-Carlos M et al. (2014) PhenoWorld: a new paradigm to screen rodent behavior. Transl Psychiatry, 4:e399.

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