



DATA COLLECTION AND EQUIPMENT CONNECTION: DIGILAB SET OF SOLUTIONS OFFERS A FUTURISTIC DIGITAL INFRASTRUCTURE BASED ON AN INNOVATIVE "DATA FUSION" PERSPECTIVE

NOWADAYS, WHEN EVERYTHING IS LITERALLY AT FINGERTIPS, OUR PRODUCT PORTFOLIO BRINGS THE MOST INNOVATIVE SET OF SOLUTIONS FOR YOUR VIVARIUM IN TERMS OF DATA MANAGEMENT, DATA REPRODUCIBILITY AND OPERATOR INTERACTION SYSTEMS. DIGILAB SOLUTIONS PROJECT YOUR VIVARIUM INTO THE NEXT ERA, ENHANCE THE THRESHOLD IN ANIMAL WELFARE, PROVIDING STANDARDIZATION IN HOUSING, SUSTAIN CARE OF USERS ERGONOMICS WHILE IMPROVING MANAGEMENT OF LAB ANIMAL FACILITIES... AND ULTIMATELY MAKE IVC CAGES SMART LIKE NEVER BEFORE.

DIGILAB PRODUCT PORTFOLIO IS COMPOSED BY DIFFERENT FLEXIBLE TECHNOLOGICAL SOLUTIONS DESIGNED TO BEST FIT INTO YOUR NEEDS AND TO STRENGTHEN YOUR VIVARIUM PERFORMANCES WHILST, AT THE SAME TIME, ENHANCE YOUR SCIENTIFIC OUTCOMES.

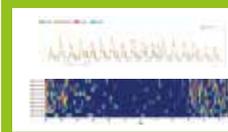
ALL THE DESCRIBED SOLUTIONS CAN BE EASILY RETROFITTED ON TOP OF YOUR CURRENT EQUIPMENT BOOSTING THEM TO THE NEXT LEVEL TO BETTER SUPPORT YOU.

## INDEX

4 DVC® FOR VIVARIUM



6 DVC® FOR RESEARCHERS



8 DVC® FOR ISOCAGE P/N



10 DVC® LITE



11 REM



12 DVC® RUNNING WHEEL



14 GATEWAY & GUARDIAN



15 LEDDY





**DVC™**  
DIGITAL VENTILATED CAGE

You are already familiar with IVCs, the core element of animal housing in your facility.  
**NOW IT'S TIME TO DISCOVER THE REVOLUTIONARY DVC®, TO MAKE YOUR IVCs SMART LIKE NEVER BEFORE!**

## TARGETS

The design and development of DVC® was driven by two main targets:

- improve research quality
- streamline facility management

These two goals were even more ambitious since, in order to effectively promote a culture of care, we wanted to collect information and data directly from the home cage, without stressing the animals.

DVC® - Digital Ventilated Cage is the powerful result of our efforts and commitment.

## COMPONENTS

The system is composed by three main components:

- the plate (an integral part of the rack, positioned in correspondence of each cage slot)
- the hardware
- the software.

**DVC® SIGNIFICANTLY IMPROVES ANIMAL WELFARE AS WELL AS FACILITY EFFICIENCY AND PRODUCTIVITY, BY CHECKING AND TRACKING 24/7 THE STATUS OF ALL THE CAGES (AND ANIMALS INTO) IN YOUR VIVARIUM.**





## Benefits at a glance!

-  **IMPROVED ANIMAL WELFARE** - 24/7 monitor food and water availabilities, evaluate bedding condition and animal activity for a complete and automatic continuous animal welfare check. Prevent any loss due to unexpected water floods.
-  **STREAMLINE YOUR JOB** - The DVC® system suggests when cage change needs to be performed. This standardizes cage conditions and reduces animal stress, the number of cage changes as well as ergonomic issues related to repetitive actions, while cutting running costs and autoclave cycles. DVC® flexibility allows to customize the system according to your needs and SOPs and automatically balance your Vivarium workload to reach its maximum efficiency.
-  **REAL TIME CAGE TRACKING SYSTEM** - No more need to manually count your cages. DVC® features an automatic cage tracking system that in real time collects these data for you: all the information you need for billing purposes are just one click away! Moreover, it provides clear reports regarding any cage history, it helps you to easily find cages and animals, as well as giving information regarding the real occupancy level of your animal rooms for a better logistic management.



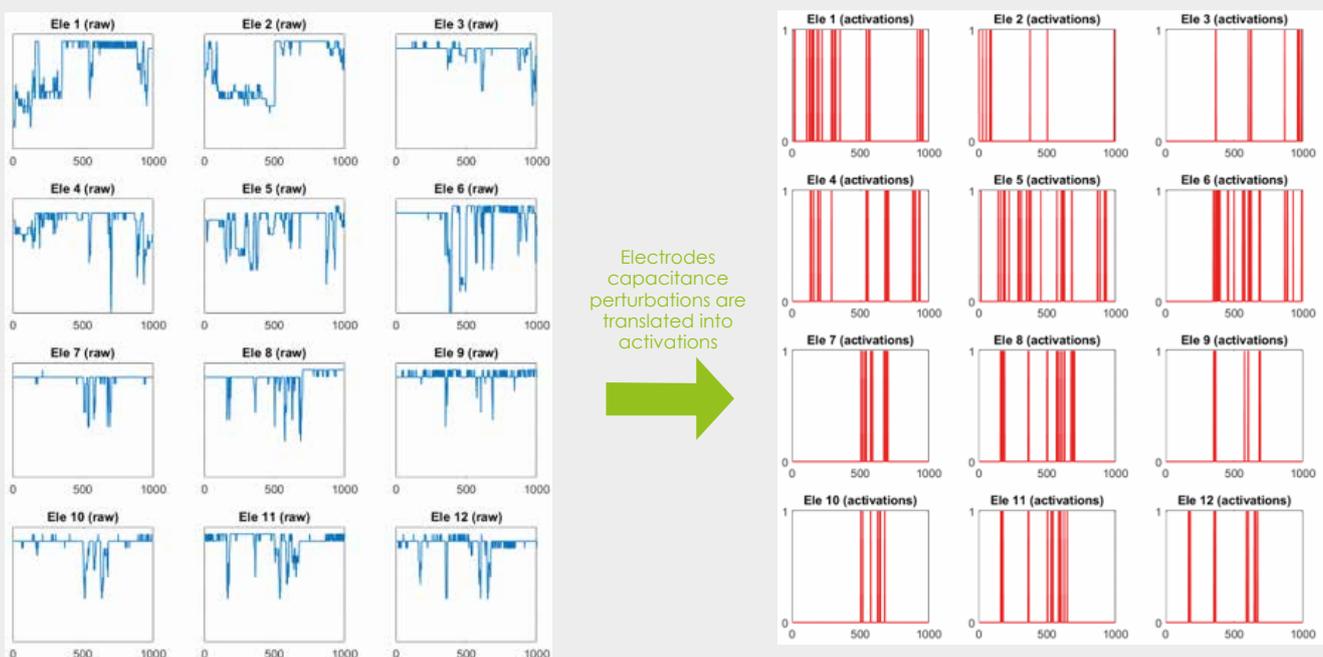
**DVC**® ANALYTICS  
SCIENTIFIC PLATFORM

Animals spend roughly 99% of the day in their home cage without being observed. Thanks to DVC® you will 24/7 capture and record data about conditions, events and activity inside each cage without disturbing or altering the animals normal cage behaviors.

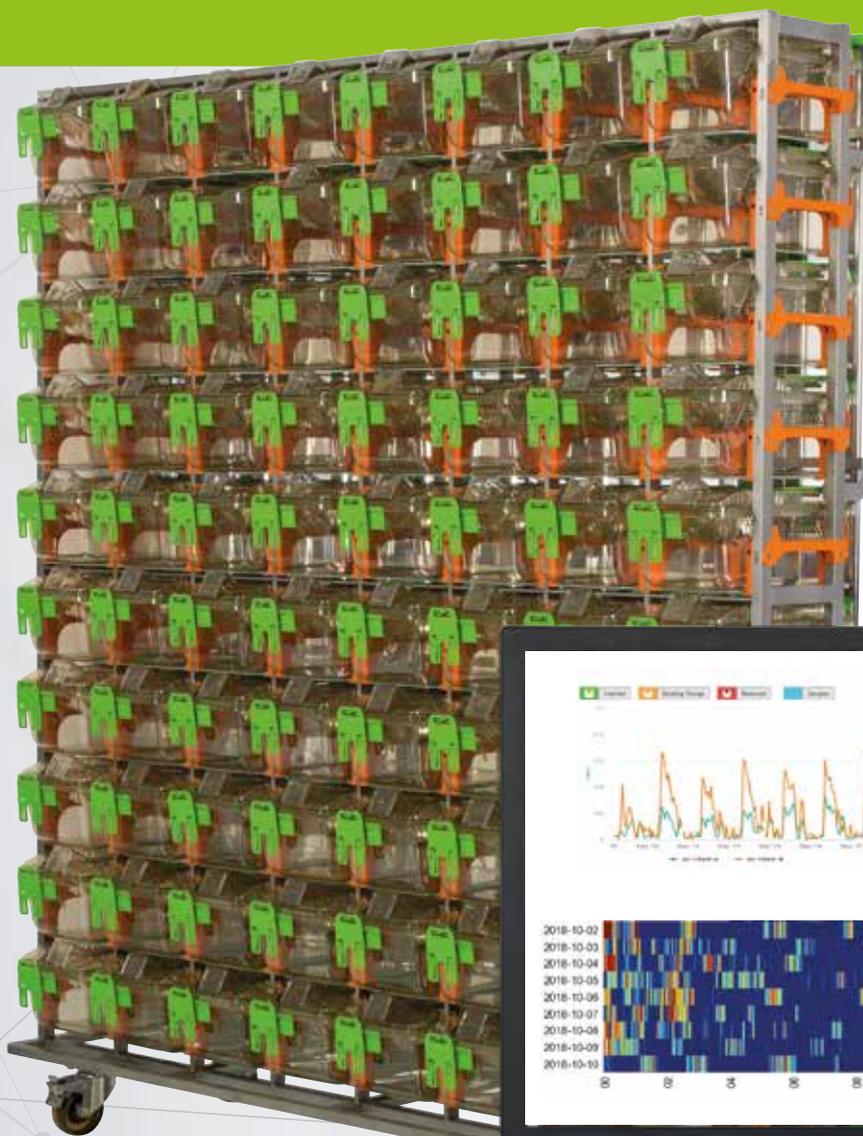
DVC® Analytics is the scientific cloud-based portal developed by Tecniplast in order to access and analyze DVC® board raw data generated by the DVC® system installed in the Vivarium, transforming them into valuable animal activity information for your study.

TAKE THE UTMOST FROM ANY EXPERIMENT WHERE SPONTANEOUS LOCOMOTOR ACTIVITY IS SCIENTIFICALLY VALUABLE INFORMATION!

This portal can be easily remotely accessed through Internet from any web-enabled device allowing researchers and Lab managers to have a deeper look inside active and completed experiments, providing complementary animal locomotor activity coming directly and automatically from the home cages.



Example: raw data are transformed into understandable parameters applying Tecniplast's validated metrics.



## ENHANCE YOUR STUDY OUTCOMES



### Benefits at a glance!

-  **OBTAIN NEW INSIGHTS** - Thanks to automatic 24/7 data collection, you will be able to capture more information from subjects when they are most active (e.g in the night) without interfering with them.
-  **INCREASE STUDY SENSITIVITY AND REPRODUCIBILITY** - Automatically collecting animal activity data, as well as related environmental conditions, lead to deeper understanding of experimental outcomes and enhance study comparison.
-  **HIGHER AVAILABILITY OF DATA THROUGHPUT** - Directly working at (DVC®) Rack level drastically improves number of available experimental samples in terms of time (animals in their environment and no need to move into specific equipment for a limited time) and space (several available cage positions).
-  **MORE ROBUST DATA** - Automatically apply validated Tecniplast's metrics in parallel to all the experimental units without interfering with animals leads to more robust and fully unbiased data.
-  **EASE EXPERIMENT START-UP** - No human intervention required to install experimental set up. Simply house animals in the standard IVC cages in the DVC® rack.



DVC<sup>®</sup> ISO  
DIGITAL VENTILATED CAGE



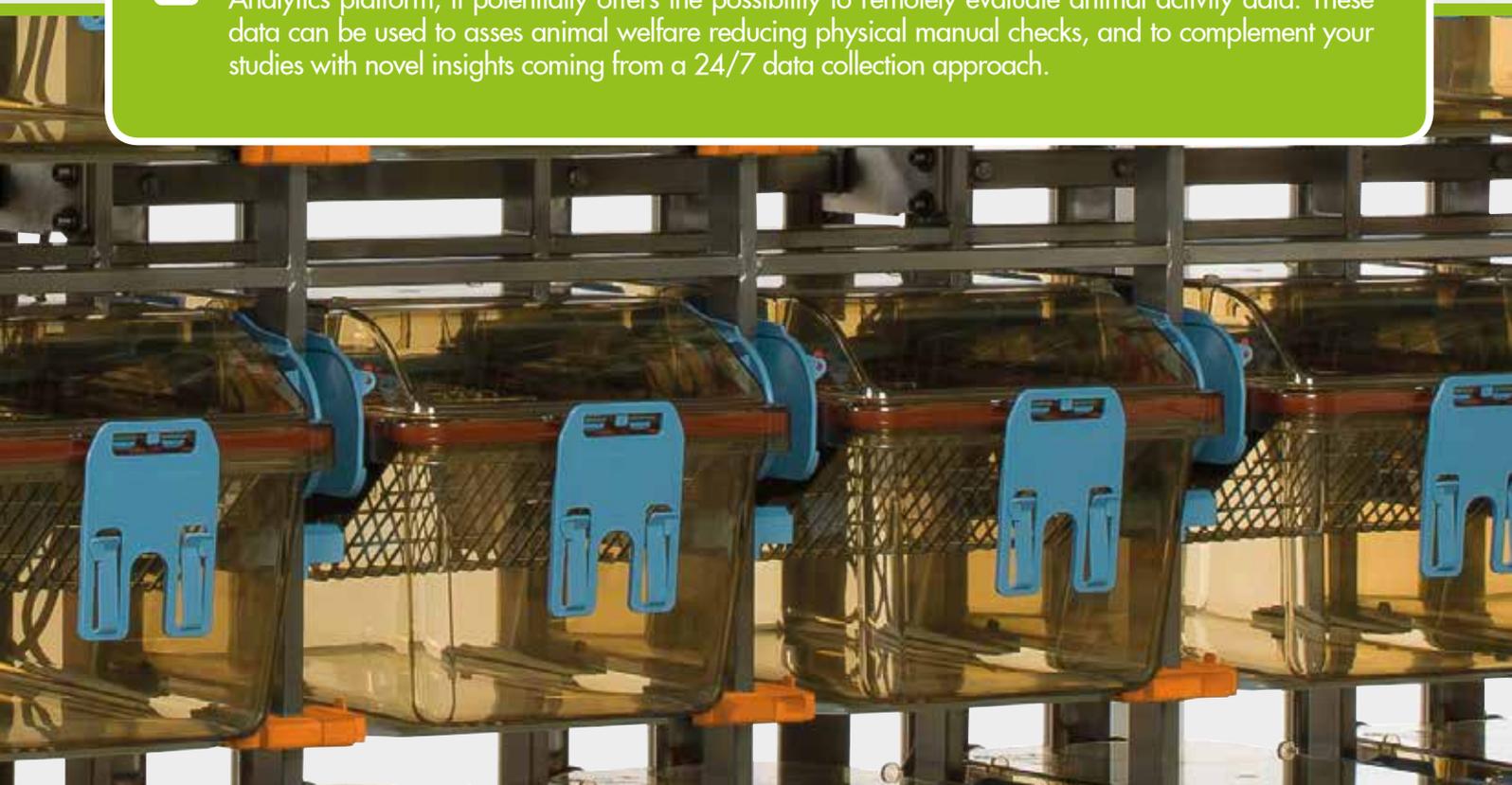
Famous worldwide Tecniplast ISOcage N and ISOcage P systems for Biocontainment and Bioexclusion respectively are now potentially even boosted by the DVC® capabilities to provide novel insights and enhance animal welfare checks thanks to the automatic data collection at cage level.

The specifically designed DVC® board can be easily retrofitted to already existing ISOcage P/N systems and enable different benefits for the researchers and vivarium people.



## Benefits at a glance!

-  **IMPROVED ANIMAL WELFARE** - 24/7 evaluate bedding condition and animal activity for a complete and automatic continuous animal welfare check. Prevent any loss due to unexpected water floods.
-  **REAL TIME CAGE TRACKING SYSTEM** - No more need to manually count or look for your cages. DVC® for ISOcage P/N features an automatic cage tracking system that in real time collects these data for you, offering an always up-to-date situation of occupation levels of your ISOcage P/N system.
-  **REDUCING ANIMAL CHECKS FOR MORE ROBUST DATA** - Used in conjunction with the DVC® Analytics platform, it potentially offers the possibility to remotely evaluate animal activity data. These data can be used to assess animal welfare reducing physical manual checks, and to complement your studies with novel insights coming from a 24/7 data collection approach.



TAKE A LOOK AT TECNIPLAST HOUSING - IVC BROCHURE TO FIND OUT MORE ABOUT OUR SOLUTIONS FOR BIOCONTAINMENT AND BIOEXCLUSION AT CAGE LEVEL!



**DVC® LITE**  
CAGE MANAGEMENT SYSTEM

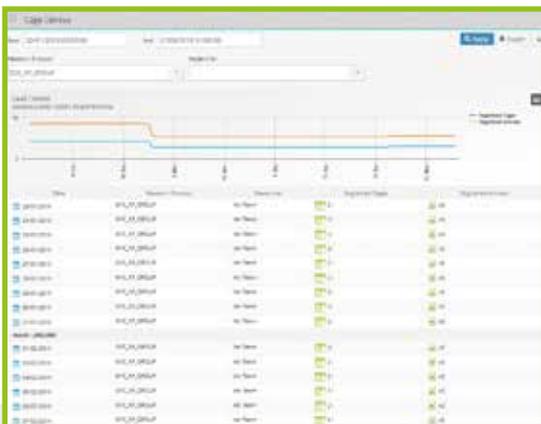
DVC® Lite has been designed for all the users who want to achieve the best performances regarding Vivarium cage management. **DVC® Lite is a lighter but still extremely powerful version of the DVC® system that offers a fundamental subset of the full benefits offered by the DVC® system itself.**

Moreover, this is the specific solution available also for all the 2GM Tecniplast customers who cannot physically retrofit the entire DVC® system into their original previous release of Tecniplast IVC Racks.



### Benefits at a glance!

-  **ONE CLICK BILLING** - No more need to manually count your cages! DVC® automatically collects these data for you: all the information you need for billing purposes are just one click away!
-  **(STATISTICALLY) STREAMLINE YOUR JOB** - The DVC® Lite system suggests when cage change needs to be performed based on statistical evaluation performed on a number of animals in every cage. This statistically-driven suggestion standardizes cages condition and reduces animals stress, the number of cage changes as well as ergonomic issues related to repetitive actions, while cutting running costs and autoclave cycles. DVC® flexibility allows the system to be customized according to your needs and SOPs, automatically balancing your Vivarium workload to reach its maximum efficiency.
-  **AVOID LOSING ANIMALS** - 24/7 detection of any sign of unwanted early water leakage coming from AW System reduces the risk of animal hypothermia.



DVC® Lite web interface allows Facility managers to monitor and manage all the cages registered in the facility, providing real time data and reports.



DVC® Lite web interface intuitively suggests Operators where assigned tasks are located and follow the status of the activities, providing a clear recap of the workload.



# REM

RACK ENVIRONMENTAL MONITORING



The primary focus of a Vivarium is to create a simulated natural environment for raising animals for observation or research. Usually, facilities are designed with sophisticated building control systems that can unfortunately fail, thus creating an unhealthy and uncomfortable environment for the animals and the personnel, as well as affecting the integrity of the research conducted therein. Sensors drift, inadvertent changes and equipment fails can go undetected and adversely affect the entire Vivarium status.

The DVC®REM (DVC® Rack Environmental Monitoring system) has been designed to automatically monitor 24/7 some important environmental parameters directly collected from the animal rooms (at DVC® Rack level). It intuitively correlates animal activity with environmental parameters for an easier research interpretation, to enhance reproducibility of results.

Detected environmental parameters are:

- **TEMPERATURE:** as a continuous measurement
- **RELATIVE HUMIDITY:** as a continuous measurement
- **NOISE:** as a continuous measurement
- **LIGHT:** light/dark phases detection
- **VIBRATION:** event triggered by minimum threshold detection
- **HUMAN PRESENCE:** event triggered by human presence detection

## Benefits at a glance!

 **NO WORRIES REGARDING ROOM ENVIRONMENTAL CONDITIONS - 24/7** room environmental parameters monitoring helps to keep under control the status of the rooms where DVC® Rack are installed and prevent any possible issue affecting husbandry and research.

 **IMPROVE REPRODUCIBILITY OF YOUR RESEARCH STUDIES WITH MORE COMPLEMENTARY DATA**  
Collecting animal activity data from the DVC® system and complementing with correlated environmental conditions provide a unique and robust approach to step forward research reproducibility and better interpret possible unexpected animal activity related results.





## DVC® GYM500

RUNNING WHEEL

Activity wheels are commonly used in several different scientific studies. The measurement of circadian activity rhythms, studies on drug screening and Neuromuscular disease, as well as on energy balance and obesity are just some examples.

The DVC® Running Wheel offers the possibility to automate the data collection directly from the IVC cage simply enabling this functionality in the DVC® system. All DVC® boards are already pre-arranged with special sensors able to detect DVC® Running Wheels rotations.

### Benefits at a glance!

-  **STAY IN THE REAL HOME CAGE IN THE HOME RACK** - No need to move animals outside the standard IVC cages: the DVC® Running wheel is simply placed inside the home cage.
-  **AUTOMATICALLY COLLECTION OF DATA** - Automatic 24/7 data collection of any rotations occurring to the wheel for an easy report creation.
-  **AVOID ANY MISTAKE** - Thanks to the DVC® automatic cage tracking system cage, you can move cages across any different DVC® Racks and the running wheel data will be automatically reaggreated regardless any different cage position occupied along the study.





DIGILAB

DIFFERENT DVC<sup>®</sup> RACK SOLUTIONS HAVE BEEN DESIGNED TO FULLY MEET FACILITY NEEDS AND REQUIREMENTS.

THESE DIFFERENT AVAILABLE PRODUCTS SHARE THE SAME DVC<sup>®</sup> PLATFORM THAT PROVIDES FULLY INTEROPERABILITY BETWEEN THEM.

Simply choose your preferred one or a mix of them based on the recap table below:

COMPARING ALL THE DIFFERENT **DVC<sup>®</sup>** SOLUTIONS FOR YOUR VIVARIUM

BENEFITS	DVC <sup>®</sup>	DVC <sup>®</sup> LITE	DVC <sup>®</sup> ISO
24/7 SPONTANEOUS ANIMAL ACTIVITY DETECTION FOR IMPROVED WELFARE ASSESSMENT	●		●
REAL TIME CAGE TRACKING FOR IMMEDIATE LOCATION AND INVENTORY	●	●	●
AUTOMATIC DAILY CAGE BEDDING CONDITION CHECK TO CUT RUNNING COSTS, STANDARDIZE CAGE CONDITIONS AND AVOID UNNECESSARY ANIMAL HANDLING	●	Stat	●
AUTOMATIC FOOD & WATER AVAILABILITY DETECTION	●		
CAGE LIGHTING TO IMMEDIATELY DISCOVER CAGE LOCATION	●		
AUTOMATIC DETECTION OF ANY KIND OF WATER FLOODINGS	●	AWS only	●
(DVC <sup>®</sup> RELATED TASKS) FACILITY WORKLOAD BALANCE AND MANAGEMENT	●	●	●
COMPATIBLE MODULES	DVC <sup>®</sup>	DVC <sup>®</sup> LITE	DVC <sup>®</sup> ISO
DVC <sup>®</sup> ANALYTICS	●		●
REM	●		●
DVC <sup>®</sup> GYM500	●		



## GATEWAY

THE WAY TO REMOTE CONTROL

Today portable devices and remote control are widely used in several applications: everyone likes dealing with these devices and the advantages coming from their use are countless.

**GATEWAY** is designed to be installed on top of your Air Handling Units. It is compatible with Smart Flow, Easy Flow, Sky Flow, Touch Slim Plus\*, ISOcage N\*\* and ISOcage P\*\*, and enables two functions:

- **ONE2ONE**: control the Air Handling Unit via any portable device
- **GUARDIAN**: complete control of any Air Handling Unit of the facility.



\* requires motherboard replacement; ONE2ONE not available  
\*\* ONE2ONE not available

## Benefits at a glance!

-  **24/7 MONITORING OF AHU ALARMS** - No more manual check for blower status. Any possible blower generated alarm is immediately detected by the Guardian system and forwarded to the final user via emails according to set preferences and timing.
-  **COLLECT 24/7 AHU DATA FOR REGULATORY PURPOSES** - All blowers' running parameters data are continuously and safely stored in a dedicated repository of the Guardian system for retrieval and reports generation in case of regulatory requests.
-  **IMPROVED SAFETY** - Avoid blower mistaken settings and immediately find the position of any blower in the Vivarium through an intuitively-designed AHU locating system.



## LEDDY

### LIGHTING CONTROL SYSTEM



Light has strong influences on the physiology and behavior of most laboratory animals. As such, lighting conditions within animal rooms are potentially significant and often underappreciated variables within experiments. Disruption of the light/dark cycle disturbs biological rhythms and has many unpredictable physiological effects. Thus, attention to the lighting environment of laboratory animals and maintaining consistency of a light/dark cycle are imperative for study reproducibility.

LEDDY module, in combination with specifically colored IVC cages, is the perfect solution to provide a robust and standardized lighting system directly at cage level.

### Benefits at a glance!



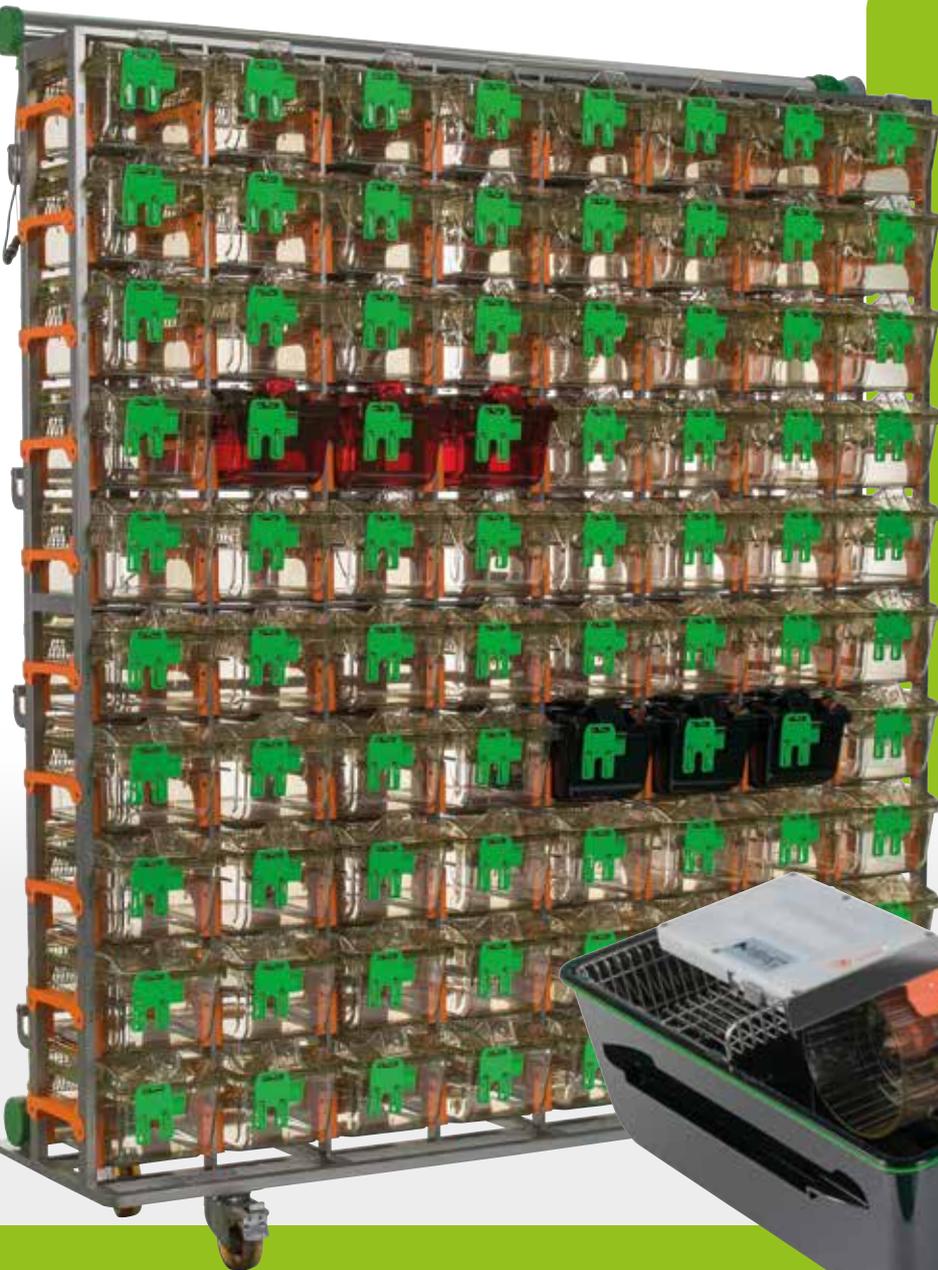
#### AVOID ANY ROOM LIGHT MANAGEMENT

Each cage is autonomously providing proper darkness levels to the animals thanks to specific plastic materials shielding the room lights. Simply using the Red or Black IVC cages in the standard IVC Rack, you don't need to work at different room light levels.



#### MULTI-EXPERIMENT FLEXIBILITY

Every single cage can be programmed with a specific illumination cycle making it independent from the other cages, and allowing to run multiple experiments in the same room and on the same rack.



## Turn your Facility into a Digital Vivarium!

DIGILAB PRODUCT PORTFOLIO OFFERS MULTIPLE OPPORTUNITIES TO BUILD UP A REAL DIGITAL VIVARIUM ATTITUDE THAT IS NOT JUST A FANCY TREND BUT NOW FINALLY BECOMES A REAL OPPORTUNITY FOR SEVERAL PARALLEL BENEFITS. FROM STREAMLINING VIVARIUM MANAGEMENT TO ENHANCING RESEARCH OUTCOMES, FROM REDUCING RUNNING COSTS TO IMPROVING ANIMAL (AND WORKERS') WELFARE.

CONNECTED DIGITAL PRODUCTS, MANAGED BY THE SAME DIGILAB INFRASTRUCTURE, OFFER THE UNIQUE OPPORTUNITY TO DISCOVER NOVEL INSIGHTS AND MAXIMIZE VIVARIUM PERFORMANCES TO AN UNPRECEDENTED LEVEL FINALLY BOOSTING THE KEY FOR THE SUCCESS OF SCIENCE, THE NECESSARY CULTURE OF CARE.

**COMPANY WITH  
QUALITY SYSTEM  
CERTIFIED BY DNV GL**  
= ISO 9001 =

**COMPANY WITH  
ENVIRONMENTAL SYSTEM  
CERTIFIED BY DNV GL**  
= ISO 14001 =

 **TECNIPLAST**  
*i n n o v a t i o n t h r o u g h p a s s i o n*

### HEADQUARTERS

ITALY | Tel. +39 0332 809711 · [www.tecniplast.it](http://www.tecniplast.it) · E-mail: [tecnicom@tecniplast.it](mailto:tecnicom@tecniplast.it); [venditeitalia@tecniplast.it](mailto:venditeitalia@tecniplast.it)

### SISTER COMPANIES

AUSTRALIA/NEW ZEALAND | Tel. + 61 2 8845 6500 · [www.tecniplast.it](http://www.tecniplast.it) · E-mail: [info@tecniplast.com.au](mailto:info@tecniplast.com.au)

CHINA | Tel. + 86 (0)21 50810920 · [www.tecniplast.cn](http://www.tecniplast.cn) · E-mail: [tecniplastchina@tecniplast.it](mailto:tecniplastchina@tecniplast.it)

FRANCE | Tél. +33 (0)4 72 52 94 41 · [www.tecniplast.fr](http://www.tecniplast.fr) · E-mail: [info@tecniplast.fr](mailto:info@tecniplast.fr)

GERMANY | Tel. +49 (0)8805 921320 · [www.tecniplast.de](http://www.tecniplast.de) · E-mail: [info@tecniplast.de](mailto:info@tecniplast.de)

UNITED KINGDOM | Tel. + 44 (0)845 0504556 · [www.tecniplast.it](http://www.tecniplast.it) · E-mail: [info@tecniplastuk.com](mailto:info@tecniplastuk.com)

JAPAN | Tel. +81 (0)3 5770 5375 · [www.tecniplast.it](http://www.tecniplast.it) · E-mail: [info@tecniplastjapan.co.jp](mailto:info@tecniplastjapan.co.jp)

USA | Toll Free: +1 877.669.2243 · [www.tecniplastusa.com](http://www.tecniplastusa.com) · E-mail: [info@tecniplastusa.com](mailto:info@tecniplastusa.com)

CANADA | Toll Free: +1 855.347.8718 · [www.tecniplastcanada.com](http://www.tecniplastcanada.com) · E-mail: [info@tecniplastcanada.com](mailto:info@tecniplastcanada.com)

TO FIND YOUR LOCAL DISTRIBUTOR, PLEASE VISIT [WWW.TECNIPLAST.IT](http://WWW.TECNIPLAST.IT)