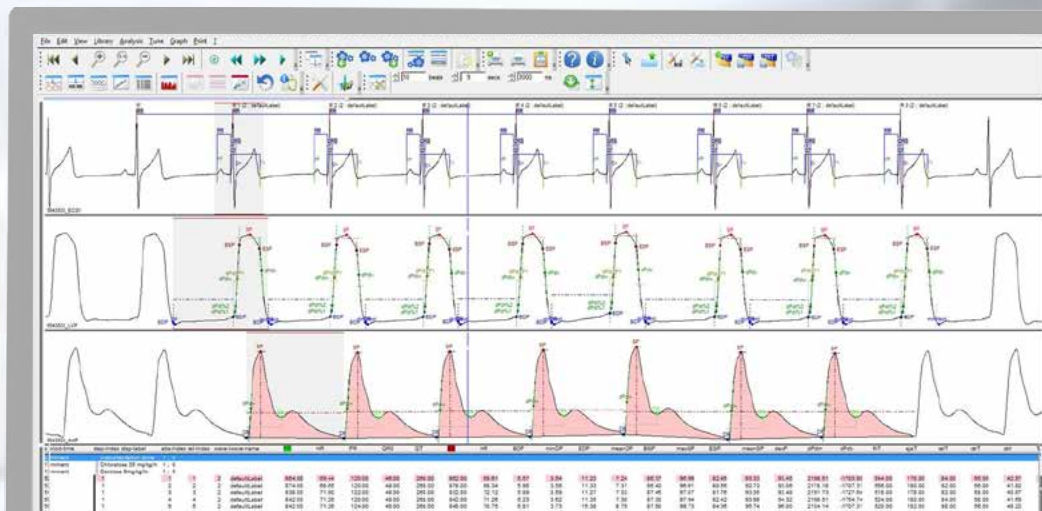


Systems for preclinical research

Cardiovascular
Respiratory
Neurology

Pharmacology
Toxicology
Physiology



emka TECHNOLOGIES, now joined with SCIREQ, has been providing integrated systems for preclinical physiology, pharmacology and toxicology research *in vivo* and *ex vivo*, for over 20 years.

Our scientific instruments are used daily, validated by renowned academic institutions, pharmaceutical companies and CROs and cited in over 2,000 peer-reviewed scientific publications.



Powerful systems for fast and reliable data acquisition

emka TECHNOLOGIES offers systems for cardiovascular, respiratory and neurological studies. Our solutions are designed to make your studies easier and safer.

For respiratory research, emka TECHNOLOGIES offers SCIREQ expertise.

SCIREQ is the emka TECHNOLOGIES' brand specialized in the conception, design and manufacture of precision laboratory equipment for preclinical respiratory research and inhalation exposure.

Unparalleled know-how, worldwide support and expertise

With a team of 70 and offices in France, Spain, Canada, USA, China, Japan, India and a network of worldwide distributors, we offer:

- » A complete range of instruments for life science research on the market
- » Fast, reliable support and service that is recognized by customers and partners

Meeting the needs and challenges of modern-day research

Our team of engineers and developers offers custom solutions for your specific research needs. We are continuously improving our hardware and software based on user feedback. We are very fast in providing added functionalities as suggested or required by our users. We know this is what you expect. We know this is our proven way to success.

Hardware & software

Products

Main applications

	TELEMETRY EQUIPMENT	PAGES 4-11
	<ul style="list-style-type: none">» easyTEL & easyTEL+ implants» easyMATRIX3» rodentPACK» emkaPACK4G	<ul style="list-style-type: none">» Arrhythmia, heart rate variability» Heart failure» Vascular diseases» Cardiorespiratory studies» CNS studies (epilepsy, sleep disorders, etc.)» Aging
	RESPIRATORY EQUIPMENT	PAGES 12-15
	<ul style="list-style-type: none">» Whole body plethysmograph» Double chamber plethysmograph» Plethysmograph for anesthetized rodents» Mass flow controller» RIP respiration from belts» tremoFlo P-100» flexiVent» inExpose	<ul style="list-style-type: none">» Asthma & airway hyperresponsiveness» ALI, ARDS & ventilator research» Air pollutants & irritants» Chronic obstructive pulmonary disease» Countermeasures» Drug development» Fundamental respiratory mechanics» Pulmonary fibrosis» Tobbaco, cigarettes, vaping
	CARDIOVASCULAR EQUIPMENT	PAGES 16-18
	<ul style="list-style-type: none">» ecgTUNNEL» rodentPACK» nibpSNAPSHOT» CODA system» Flowmeters» Pressure & pressure/volume catheters	<ul style="list-style-type: none">» Thrombosis» Hypertension» Heart failure» Artherosclerosis» Cardiac insufficiency
	VITAL SIGN MONITORING & SURGERY	PAGES 19
	<ul style="list-style-type: none">» SomnoSuite anesthesia system» PhysioSuite & MouseSTAT» Surgical platform	<ul style="list-style-type: none">» Anesthesia» Vital sign monitoring» Surgery
	ISOLATED ORGANS & TISSUES	PAGES 20-21
	<ul style="list-style-type: none">» emkaBATH2 tissue bath» emkaBATH4 tissue bath» isolatedHEART system» Electrical stimulator» Perfusion system for mesenteric beds	<ul style="list-style-type: none">» Contractility» Electrophysiology» Hypertension» Drug-induced cardiac toxicity» Ischemia-reperfusion
	DATA ACQUISITION & ANALYSIS SOFTWARE	PAGES 22-27
	<ul style="list-style-type: none">» iox2 software» ecgAUTO software» datanalyst software» studyDESIGNER software	<ul style="list-style-type: none">» Data acquisition and real-time analysis» Post-processing analysis» Data reduction and reporting» Study management

Implantable telemetry for large animals

easyTEL+ implant



Continuous, real-time measurement of physiological data

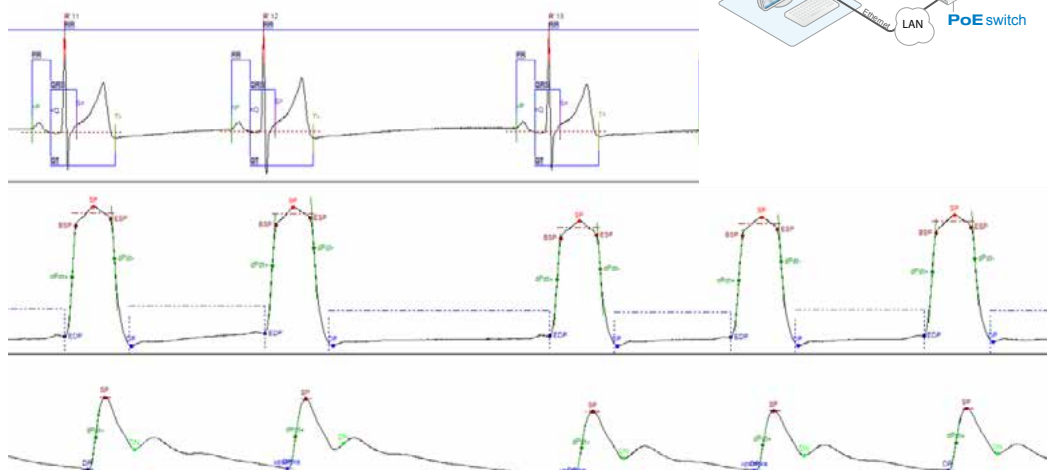
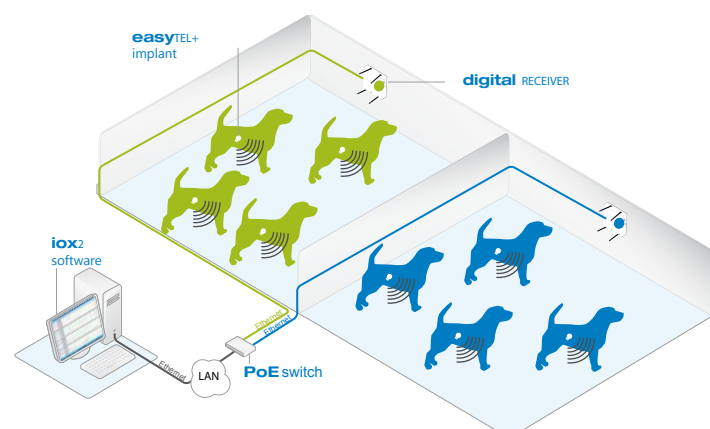
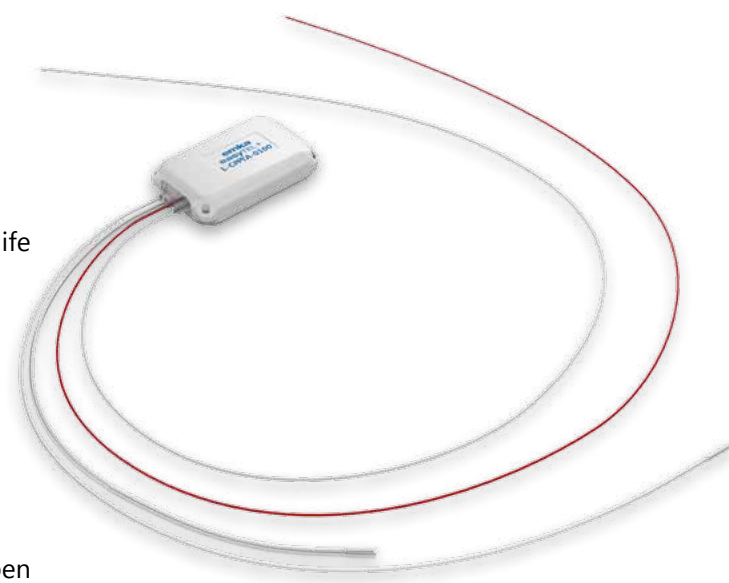
- » Biopotential (ECG, EEG, EMG)
- » Temperature
- » Blood pressure (arterial and/or Left Ventricular Pressure)
- » Acceleration from 3 axis accelerometer (activity)

Features & benefits

- » Transmission range 4 to 6 m
- » Group housing of up to 32 animals in the same room
- » Fully digital with no possible crosstalk
- » Sampling frequency user settable, to optimize battery life
- » Up to 500 days of continuous transmission
- » Records battery on-time of each implant
- » Implant set to active or sleep mode remotely
- » Implant full on/off with magnet

Easy, robust & cost-effective infrastructure

- » easyTEL+ implant is surgically implanted in the animal
- » digitalRECEIVER collects signals from up to 4 implants
- » digitalRECEIVER can be placed outside animal cage or pen
- » digitalRECEIVER contains ambient pressure monitor
- » 1 Ethernet cable per receiver handles data & power
- » smartTOOL detects and configures implants
- » Simultaneous monitoring from multiple distant PCs
- » Automatic reconnection if subject is momentarily away from receiver or after network failure
- » Implant prices very competitive
- » Implants can be re-implanted as long as battery lasts
- » No refurbishment and no associated costs or delays



Canine ECG, Left Ventricular and Arterial Pressure signals



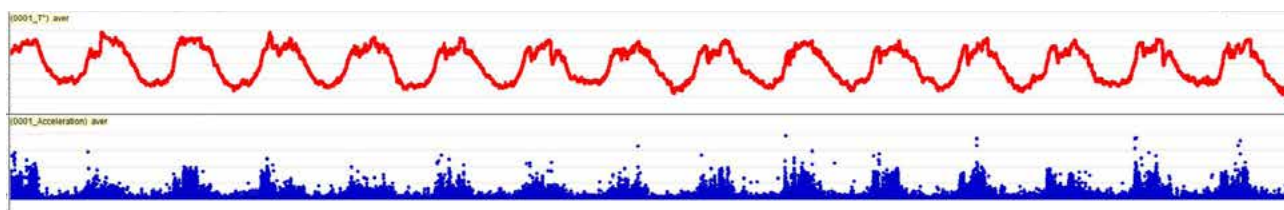
Implantable telemetry for large animals

easyTEL+ implant

Acquisition & analysis with iox2 software

easyTEL+ exclusively runs with emka iox2 software:

- » Signal acquisition and real-time analysis
- » Synchronized video
- » Alarms generated when selected parameters cross preset thresholds, automated e-mails
- » Signal quality recorded, analysis able to skip lost data zones
- » Automated detection of onset of fever with alarm generation for MCM and infectious diseases studies



14 days of temperature and activity data from pair-housed primate

Several models to fit your needs

Models	Biopotential	Pressure 1	Pressure 2	Temperature	Activity	Battery life* (days)	Size (mm)	Weight (g)
L _ TA				1	1	500	51x35x14	29
L _ PT		1		1		200	51x35x14	29
L _ ETA	1			1	1	250	51x35x14	30
L _ EPTA	1	1		1	1	160	51x35x14	33
L _ EPPTA	1	1	1	1	1	105	51x35x14	34
L _ EEPPTA	2	1	1	1	1	85	51x35x14	35
M_ PT		1		1		50	35x29x14	16
M_ EPTA	1	1		1	1	40	35x29x14	17

* Battery life given for standard sampling frequencies of 500Hz for biopotential, 250Hz for pressure 1 and 500Hz for pressure 2.

PT implants can be combined with emkaPACK4G, for implanted pressure and temperature and non-invasive ECG and respiration recordings.



smartTOOL, for implants detection and configuration

Implantable telemetry for rodents

easyTEL implant



Continuous, real-time measurement of physiological data

- » Biopotential
- » Blood pressure
- » Temperature
- » Activity

Features & benefits

- » Available in two sizes, for small (>20g) or medium animals (>100g)
- » Designed to accommodate intraperitoneal placement
- » After implantation, use a magnet to turn implant on or off
- » Up to 8 months of continuous transmission
- » Ability to acquire analog signals, synchronized with implants
- » easyTEL implant compatible with DSI™ hardware & Ponemah software
- » Implants can be re-implanted as long as battery lasts
- » No refurbishment and no associated costs or delay

Easy, flexible & cost-effective infrastructure

- » easyTEL implant is surgically implanted in the animal
- » easyTEL RECEIVER collects signals from the implant
- » easyTEL RECEIVER is placed under the animal plastic cage
- » easyMATRIX connects via USB to the computer running iox2 acquisition software

Acquisition & analysis with iox2 software

easyTEL exclusively runs with emka iox2 software:

- » Signal acquisition and real-time analysis, synchronized video
- » Alarms generated when selected parameters cross preset thresholds (flashing display, audio tone or send e-mails)
- » Automated detection of onset of fever with alarm generation

Several models to fit your needs

easyTEL-S	Models	Biopotential (ECG, EEG, EMG)			Temperature	Activity	Battery life	Dimensions	Weight
For animals > 20g	ETA	1			1	1	3 months	20x10x8 mm (1.6 cc)	3.3 g
	TA				1	1			
easyTEL-M	Models	ECG	EEG	Temperature		Activity	Battery life	Dimensions	Weight
For animals > 100g	CTA	1		1		1	8 months	27x14x12 (4.5cc)	6.5 g
	ETA		1	1		1			
	TA			1		1			



Implantable telemetry

easyMATRIX3, link from telemetry implants to emka TECHNOLOGIES software suite

- » Reads signal from easyTEL & DSI™ implants (including HD models) and from analog inputs
- » Records calibrated data in iox2

Features & benefits

- » Contains its own ambient pressure transducer
- » No need of OpenART™ or acquisition card in computer
- » Only requires connection to existing receivers and to a PC (USB & Ethernet)
- » Provides power and amplifies external transducers
- » Accepts amplified analog signals
- » Accurate synchronization of signals from different sources (i.e pleural pressure from implant and respiratory flow from head-out plethysmography for resistance & compliance measurement)



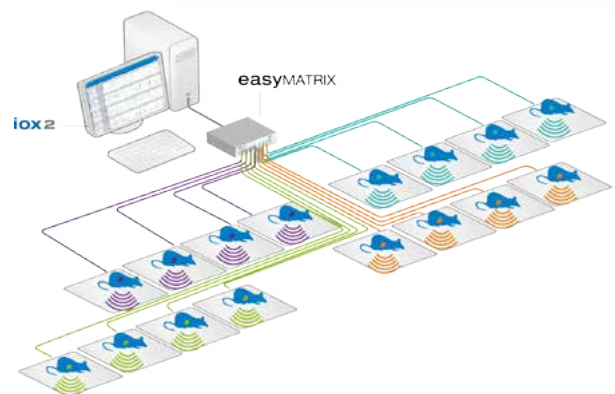
System configuration

A single easyMATRIX3 can handle:

- » Up to 16 implant receivers and 8 analog inputs
- » 1, 2 or 4 receivers used for each subject

Up to 4 easyMATRIX3 can be connected to a single computer

"Acquire simultaneously synchronized signals from up to 16 implants and 8 analog inputs"



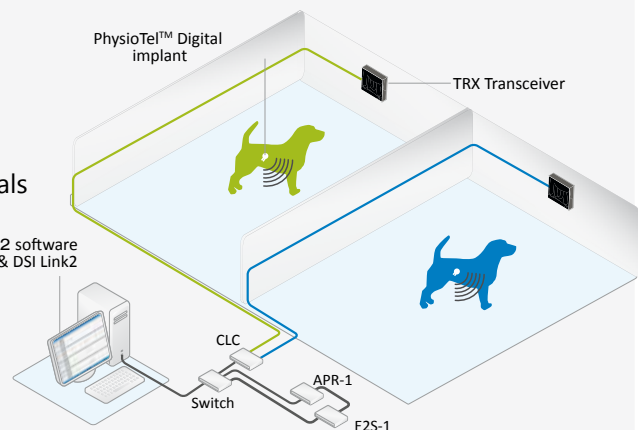
DSI Link2, dynamic link between iox2 software and DSI implantable telemetry

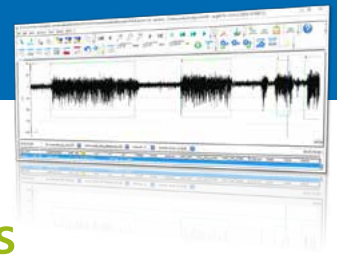
- » Acquires telemetry data from DSI PhysioTel™ Digital and HD implants
- » Performs real-time analysis in iox2 software

Hardware compatibility

iox2 software with its DSI Link2 can be used with:

- » PhysioTel™ Digital implants, designed for large animals
- » PhysioTel Digital Transceiver (TRX)
- » Communication Link Controller (CLC)
- » C12V converter, to collect data from analog output
- » PhysioTel® HD implants
- » PhysioTel® receivers
- » Matrix 2.0 (MX2)
- » Ambient Pressure Reference Monitor (APR)
- » E2-S1 module



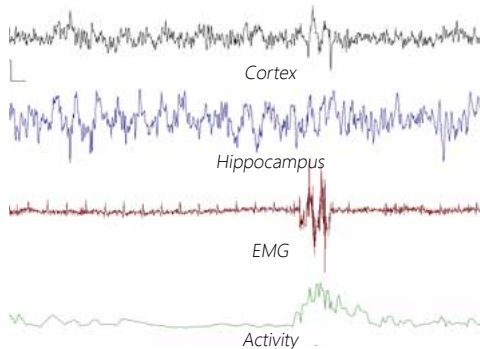


Telemetry for neuro cardiovascular studies

rodentPACK, head mounted or backpack solution for rodents >50g



"Ideal alternative to swivels or implants!"



Configurable signals acquired

- » 4 biopotentials (EEG, ECG, EMG), sampled at up to 1000Hz
- » x/y/z and global accelerations for postural & activity assessment

Compact, light and powerful

- » Transmitter has a 22mm diameter and weighs 4.4g with batteries
- » Transmission range up to 5 m
- » 150 hours of continuous recording before replacing batteries
- » Excellent noise-free EEG signal
- » No refurbishment, batteries cost less than 2\$/recording
- » Same transmitter may be used on any implanted animal
- » Rapid acclimation: rats are not restrained in their activities
- » Animal is freely moving: ideal alternative to tethered system
- » Group housing with multiple animals in same cage
- » Up to 32 animals in same room with no required shielding

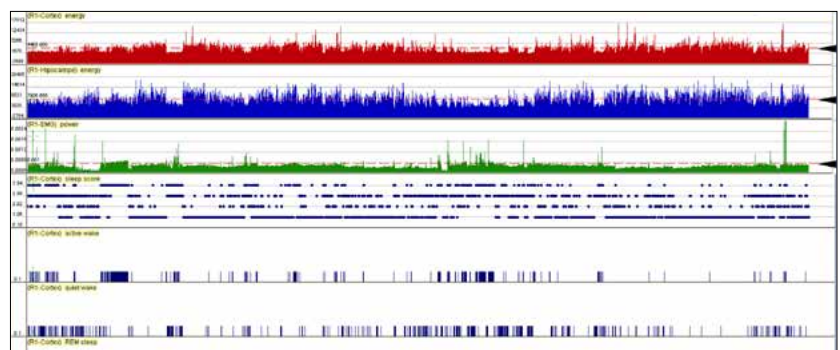
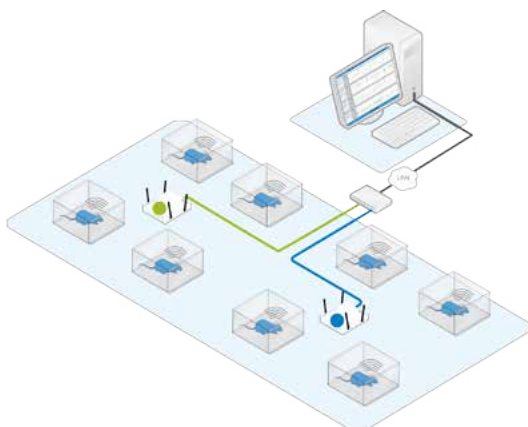
System configuration

- » A skull connector permanently implanted, fitted with implanted electrodes for EEG, ECG and/or EMG measurements
- » A transmitter, connected to skull implant only during recordings
- » One receiver for 4 animals
- » smartTOOL for transmitter configuration

May also be used as a transmitter alone, for jacket ECG (see page 16)

CNS analysis with ecgAUTO software

- » Generates FFT power spectrums with user defined frequency bands
- » Automated sleep scoring module
- » Automatic seizures detection
- » Total acceleration useful for validating events on EEG/EMG traces





Non-invasive telemetry

emkaPACK4G for large animals



17 signals produced simultaneously

- » 9 lead ECG
- » 2 respiration belts signals
- » Posture and activity (3 axis + total acceleration)
- » Temperature
- » Blood pressure from:
 - Non-invasive oscillometric cuff (NIBP)
 - Vascular Access Port (VAP)
 - easyTEL+ implant



Features & benefits

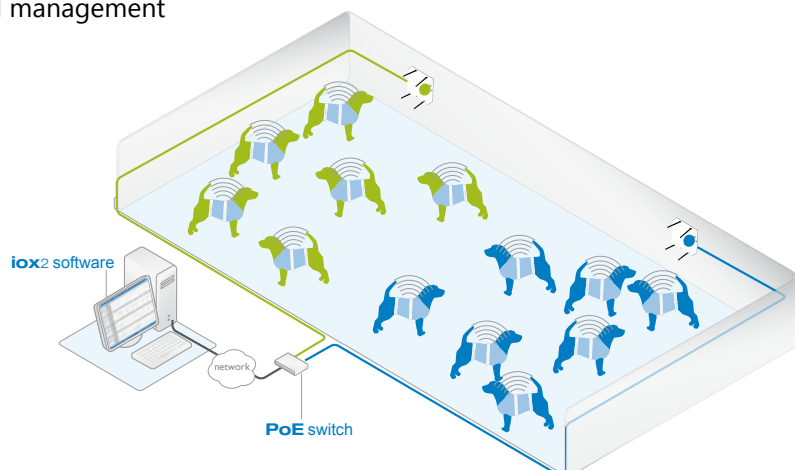
- » Non-invasive
- » For freely moving large animals, such as dogs, primates, sheep, pigs and horses.
- » 32 to 48 subjects per room, group or single housed
- » Information on lost electrode & low battery level
- » 10 m transmission range
- » 48 to 72 hours on same batteries
- » Each signal available as an optional add-on: buy only what you need and upgrade at any time

Powerful, flexible & compact infrastructure

- » External transmitter worn by each subject in a jacket
- » Physiological measurements captured non-invasively & radio-transmitted by Bluetooth, to a receiver
- » Receivers, positioned in the animals' room (only 1 receiver for 16 animals)
- » Only 1 Ethernet cable per receiver

emkaPACK4G takes full advantage of emka TECHNOLOGIES software suite

- » Full range of on-line and off-line signal analyzers
- » easy & seamless calibration of all signals including respiration belts
- » Synchronized video
- » GLP tools, audit trail and electronic signature
- » Global study data organization and management



Non-invasive telemetry

emkaPACK4G optional modules



ECG measurement

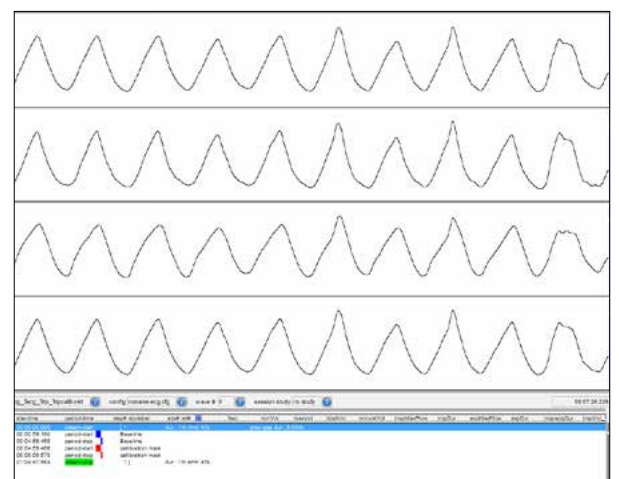
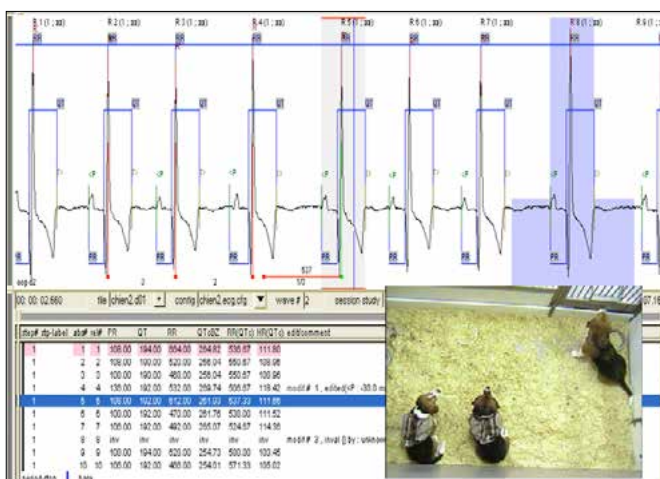
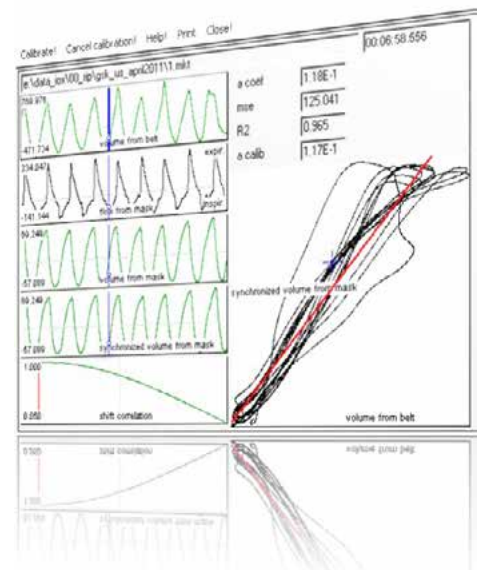
- » 9-lead ECG from external electrodes
- » Gold standard analysis for any species, any lead



RIP respiration from belts

- » Thoracic and/or abdominal belts fully adjustable and directly connected to emkaPACK4G transmitter
- » Lung volume measurement via respiratory inductive plethysmography
- » Respiration flow is derived from lung volume
- » Provides all standard pulmonary parameters & phase shift computation for bronchoconstriction assessment

ecgAUTO RIP analyzer provides absolute values and parameters linked to phase shift between the thoracic and abdominal belts.



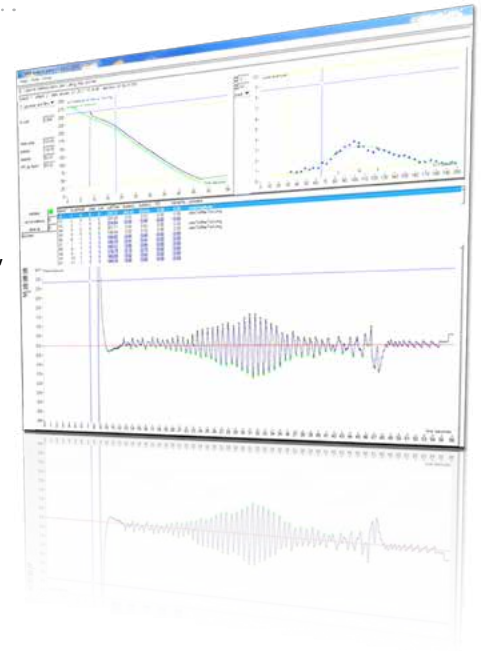


Non-invasive telemetry

emkaPACK4G optional modules

Reliable NIBP, not a black box

- » Proven and validated non-invasive oscillometric cuff method
- » Proprietary software for analysis and control
- » 60 to 90% of cycles provide reliable data
- » Automated rejection of unstable cycles
- » With the ecgAUTO software NIBP module, you can see the recorded data, see how they were processed, and invalidate or edit results



Blood pressure via vascular access port, with bptVAP module

- » Easy connection to implanted arterial VAP
- » No transducer drift, easy calibration
- » Up to 2 measurement points per animal



Blood pressure & temperature from easyTEL+ implant

- » Signal from easyTEL+ implant radiotransmitted to the implant manager module
- » Implant manager module housed in a jacket and connected to emkaPACK4G transmitter

Temperature

- » Skin temperature from thermistor or core temperature from easyTEL+ implant
- » Automated onset of fever detection with iox2 software



Specific jacket and t-shirts design

- » ¾ length or full length jackets available for canine, primate, swine and sheep, with a number of custom features, depending on emkaPACK4G options
- » The transmitter is located in a custom pocket on the back of the jacket
- » Undershirt is a tight fitting spandex garment that closes and adjusts by means of Velcro fasteners:
 - A series of external belt loops allow for the best positioning of the two respiratory belts
 - The ECG leads are held in place by the undershirt

Plethysmography

Plethysmography is a method for studying pulmonary function in laboratory subjects. The barometric plethysmography technique measures flow and pressure changes that occur while the subject is breathing, before and after exposure to a drug or other challenges.



Whole body plethysmograph for freely moving subjects



Measurements

- » Respiratory rates and durations
- » Flow and volume changes
- » Quantifies the degree of bronchoconstriction (penH)

Features & benefits

- » For conscious and freely moving mice, rats and guinea pigs
- » Non-invasive measurements for longitudinal studies
- » Ease of use
- » Efficient screening



System configurations

- » Temperature and humidity correction
- » Aerosol or gas exposure
- » Apnea and cough/sneeze detection pack
- » Adapted plethysmograph for behavior studies
- » Swivel/tether system (rats and guinea pigs), for simultaneous measurement of additional physiological parameters (BP, ECG, SPO₂...) or blood sampling following drug injections
- » Chamber for neonates
- » Possible combination with implanted telemetry for cardiorespiratory studies (ECG, blood pressure)

Mass flow controller for gas mixture



- » Deliver a specific gas mixture to animal chamber
- » Ideal for hypoxia, hyperoxia, hypercapnia evaluation
- » Add-on option for whole-body plethysmography setups or whole body exposure chambers
- » Up to 3 gases can be controlled
- » iox2 software performs acquisition and controls the mass flow controllers (modify the composition of the gas mixture in real time, directly from iox2)



Double chamber plethysmograph for conscious restrained subjects



Measurements

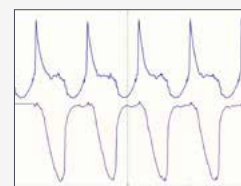
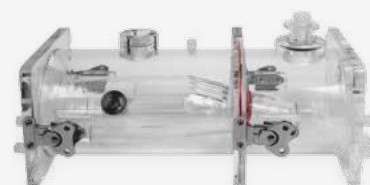
- » Respiratory rates and durations
- » Real volume and flow
- » Specific airway resistance and conductance (sRaw, sGaw)

Features & benefits

- » Non-invasive measurements for longitudinal studies
- » Ease of use

System configurations

- » Aerosol or gas exposure
- » Can be used in head-out configuration
- » Real resistance/compliance measurements on conscious animals using pressure signal from a telemetry implant and flow signal from a plethysmograph



Plethysmograph for anesthetized rodents



- » Measurements of pulmonary pressure and flow
- » Full pulmonary mechanics (resistance/compliance...)
- » May be used on ventilated or spontaneously breathing subjects
- » For mice, rats and guinea pigs
- » Aerosol can be delivered during ventilation
- » Can be combined with cardiovascular signals (BP, ECG...)



Systems for large animals

RIP respiration from belts



- » Lung volume measurement via respiratory inductive plethysmography (see "Non-invasive telemetry" section page 10)



tremoflo P-100

- » Portable lung function testing instrument
- » Measures resistance and reactance, respiratory rate & tidal volume
- » Non-invasive technique for conscious large animals
- » Captures small airways
- » Offers translational measurements



RESPIRATORY EQUIPMENT

Respiratory mechanics

flexiVent, the gold standard for *in vivo* lung function measurements

The flexiVent goes beyond traditional resistance and compliance measurements and captures crucial details about the mechanical properties of conducting airways, terminal airways and parenchyma.

Using the forced oscillation technique (FOT), the flexiVent offers a highly detailed and reproducible assessment of lung function.



Broadest range of measurements in a single platform

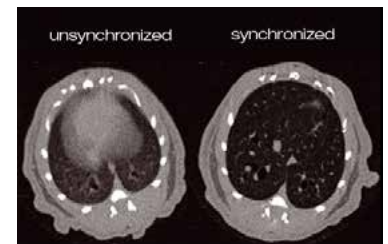
- » Single frequency FOT (resistance/compliance) - obtain classic resistance and compliance measurements
- » Broadband FOT - distinguish between central airways and alveolar tissues
- » Pressure-volume loops - capture quasi-static and non-linear properties
- » Forced expirations - acquire translational outcomes similar to spirometry (FEV, FVC)
- » Lung volumes - determine total lung capacity (TLC), functional residual capacity (FRC) & residual volume (RV)
- » Delivered dose - estimated dose delivered to the subject for easy comparison across subjects, groups & studies

Features & benefits

- » Modularity - interchangeable modules for different subject sizes (from 3g to 2kg)
- » Reproducibility - standardized and automated protocols
- » Accuracy - sensitive device offering precise control of experimental conditions

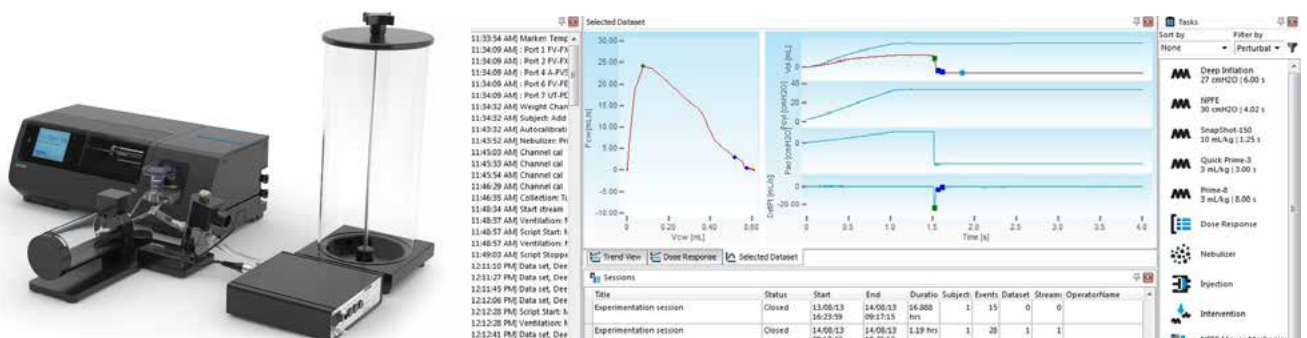
Systems & configurations

- » Aeroneb ultrasonic nebulizer efficiently delivers bronchoreactive agents and drugs deep into the lungs
- » FEV extension for Negative Pressure Forced Expiration (NPFE)
- » *In vivo* thoracic imaging for integration with CT scanners
- » Vital signs monitoring - body temperature, heart rate & blood pressure



flexiWare software

flexiWare offers advanced analysis and detailed respiratory mechanics outcomes, allowing for deeper insight into the lungs. flexiWare achieves this with a wide range of automated scripts, respiratory analyzers and powerful graphing and data export tools.





Exposure systems

inExpose, compact inhalation exposure



The inExpose is designed to operate under a standard fume hood, and distinguishes itself by its compact size and high level of integration. Its modularity and integration permits both nose-only and/or whole body exposure of rodents or cells, as well as automated generation of cigarette smoke, electronic cigarette vape, and aerosols.

Features & benefits

- » Compact size and high level of integration
- » Fully automated computer and software control
- » The system's low internal volume allows for unintentional dilution of precious compounds and aerosol rain-out is captured to allow users to re-use their costly compound



System configurations

- » Nose-only or whole body exposure platforms available for mice, rats and cells
- » Cigarette Smoking Robot (CSR) for computer-controlled and automated lighting and ejection of up to 24 cigarettes with programmable puff profiles
- » Evacuation control with an adjustable exhaust flow system to maintain cigarette lighting efficiency
- » E-cigarette and vaping adapter for both *cig-a-like* models and *mod* e-cigarettes
- » Aerosol generation with the Aeronex nebulizer
- » Quantitative and qualitative atmospheric monitoring & recording



flexiWare software

The system is fully managed using our Windows-based software, flexiWare, which permits real-time monitoring, visualization and recording of data. All data is recorded with a time stamped log, and may be exported to a variety of formats including Microsoft Excel.

Non-invasive systems

ecgTUNNEL for cardiorespiratory studies



- » Gets 6-lead ECG signal in a few seconds with 4 electrode pads
- » Optional respiration measurement (like in whole body pethysmograph)



Features & benefits

- » Designed for conscious restrained mice and rats
- » Non-invasive - no anesthetic and no surgery
- » Rapid adaptation
- » Each model accommodates neonate to adult subjects (interchangeable tunnels)
- » Quick and easy setup - Tunnel gently and firmly restrains the subject while 4 electrode pads record up to 6-lead ECG
- » Plug-&-play data acquisition (integrated amplifier, USB link to PC)



For respiratory studies, the setup is completed with:

- » A respiratory dome, with a pneumotachograph
- » A bias flow pump for air renewal
- » A differential air pressure transducer

rodentPACK, wireless backpack solution for rodents



Configurable signals acquired

- » 1 or 2-lead ECG (2 or 4 electrode cable)
- » x/y/z and global accelerations for postural & activity assessment

Features & benefits

- » Compact & light : transmitter weighs 4.4g with batteries
- » Transmission range up to 5 m
- » 150 hours of continuous recording before replacing batteries
- » Rapid acclimation: rats are not restrained in their activities
- » Group housing with multiple animals in same cage
- » Up to 32 animals in same room with no required shielding
- » May also be used for EEG acquisition (fixed to the cranium)



System configuration

- » A transmitter, worn into a jacket, fitted with miniature ECG cables and skin electrodes,
- » One receiver for 4 animals
- » Fully digital: only 1 Ethernet cable per receiver handles data & power



CODA™ for rodents



- » Non-invasive blood pressure from mice and rats
- » 6 parameters measured simultaneously: systolic, diastolic, mean BP, heart rate, tail blood volume & flow

Features & benefits

- » Up to 8 rodents on the same system
- » Clinically validated Volume Pressure Recording (VPR)
- » Dark-skinned mice (C57BL/6) without difficulty
- » Awake or anesthetized animals with equal accuracy & reliability
- » MRI compatibility
- » Seven holder sizes available
- » Tail is unrestrained to allow for regular tail movement



nibpSNAPSHOT, for large animals



Non-invasively measures oscillometric blood pressure (NIBP) & 7-lead ECG

- » 60 to 90% of cycles provide reliable NIBP data
- » Automated rejection of unstable cycles
- » Place the cuff around the limb and start the inflation/deflation cycle
- » Immediately see both the signal, and results to assess their quality



"Ideal for Toxicology center using large animals"

Flowmeters

Flowmeters - Gold Standard

Combine Transonic transit-time technology flowmeters and iox2 software for acute or chronic flow measurement on blood vessels or perfusion tubings.

- » Measure volume flow through arteries, veins and ducts of different species (diameter ≥ 0.25 mm)
- » Extensive range of probes available to suit your needs
- » Tubing and perfusion applications also possible
- » Wide range of Laser Doppler Probes available to perform microvascular perfusion measurements in approximately 1 mm³ of tissue



Catheters

Pressure & pressure/volume catheters

emka TECHNOLOGIES provides catheters from Transonic Scisense, to be used with iox2 acquisition software, for the study of hemodynamics and cardiac function in small and large animals hearts.

- » Full range of sensors from mouse size to large animals (1.2F - 7F)
- » Ideal for arterial, venous or cardiac pressures (solid state sensor accurately responds to minute and rapid changes in pressure)
- » Variable Segment Length catheters (4 volume electrode options) for more flexibility in matching ventricle sizes
- » Single and multiple pressure and volume measurement



Pressure-Volume system

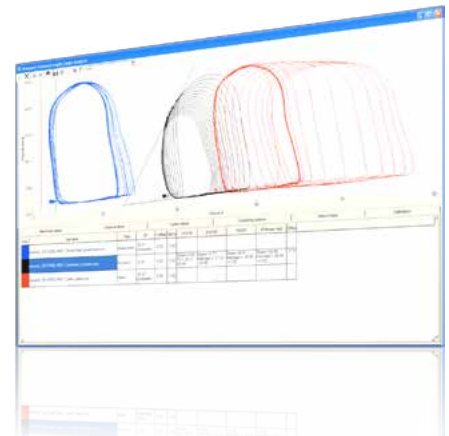
The Scisense ADV500 Pressure-Volume System can be used in either legacy Conductance or improved Admittance mode:

Conductance method :

- » Measures pressure and magnitude in real-time, creating pressure-magnitude loops
- » Required saline injection to remove parallel conductance
- » Volume can only be calculated post-experiment

Admittance method :

- » Measures pressure, volume, phase angle (useful in locating catheter in the ventricle) and magnitude in real-time, creating pressure-volume loops
- » No need of saline injection
- » Continuous and automatic correction of parallel volume



Acquisition and complete analysis within iox2 software

Complete analysis of loops can be performed (steady-state, vena cava occlusion) from pressure & volume signals:

- » ESPVR, EDPVR, PRSW... computation
- » ESP & EDP points are adjusted in the occlusion analysis for a series of loops
- » Loops from single or multiple animals are simultaneously displayed
- » PV cycles are user selectable for loop analysis



Vital sign monitoring & Surgery for rodents

SomnoSuite, small animal anesthesia system

- » For mice and rats (neonatal mice to 500g rats)
- » Precision low-dose delivery system uses less than 1cc of isoflurane/hr
- » Integrated digital vaporizer
- » Digital automatic ventilator, both volume & pressure controlled
- » Optional add-on modules for vital sign monitorings (see below)



Vital sign monitoring

Pulse oximeter & heart rate monitoring

- » Heart rate, SpO₂, respiratory rate

Automatic ventilation

- » Neonatal mice to 500g rats
- » Control ventilation by pressure or volume

End-Tidal CO₂ Monitoring

- » Real-time capnography
- » Sidestream sampling

Temperature monitoring and homeothermic control

- » 2 warming pads & 2 temperature sensors



Multifunctional surgical platform

- » Animal warming
- » Bright LED lighting
- » Temperature monitoring
- » Homeothermic control
- » Magnetic stabilization
- » Multi-positional retractors
- » Easy to clean, stainless steel surgical surface
- » Integrated, rechargeable far infrared warming pad
- » Magnetic nose cone/intubation tubing stabilizers
- » Magnetic limb positioners (used with elastic wire)
- » Replacement surgical field covers



Tissue bath setups

Isolated tissues and microvessels



- » Compact & integrated benchtop setups
- » Ideal for aorta, trachea, papillary muscles etc.
- » Bath temperature display and control
- » Physiological liquid heated in-line - no need of extra water heater
- » Available with 2 models of isometric transducers (possible adaptation of isotonic transducers)
- » Can be used as standalone setup or connected to iox2 software



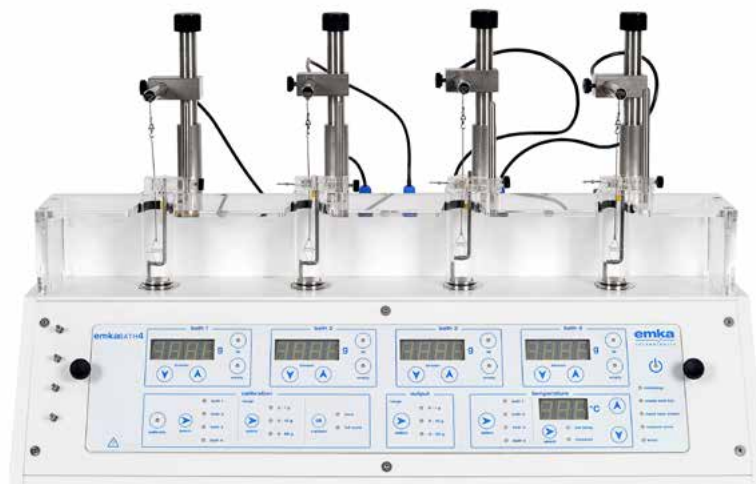
emkaBATH2, compact and cost-effective

- » 1 or 2-baths
- » Fits on lab benchtop
- » Simple to set up, run and clean
- » Automatic bath filling (accessible from protocol in iox2)
- » Manual bath emptying and tissue tension
- » Closed triangle and C shape hooks available



emkaBATH4 , 2-in-1 tissue bath system

- » Up to 4 baths (5, 10 or 20 ml)
- » For isolated tissue & microvessel studies
- » Automated bath filling/emptying/renewal/overflow
- » Automated motorized tissue tensioning and lengthening
- » Electrodes for contact or field stimulation
- » Open or closed triangle, L and C shape hooks available
- » Automated software control from iox2 and direct front panel control



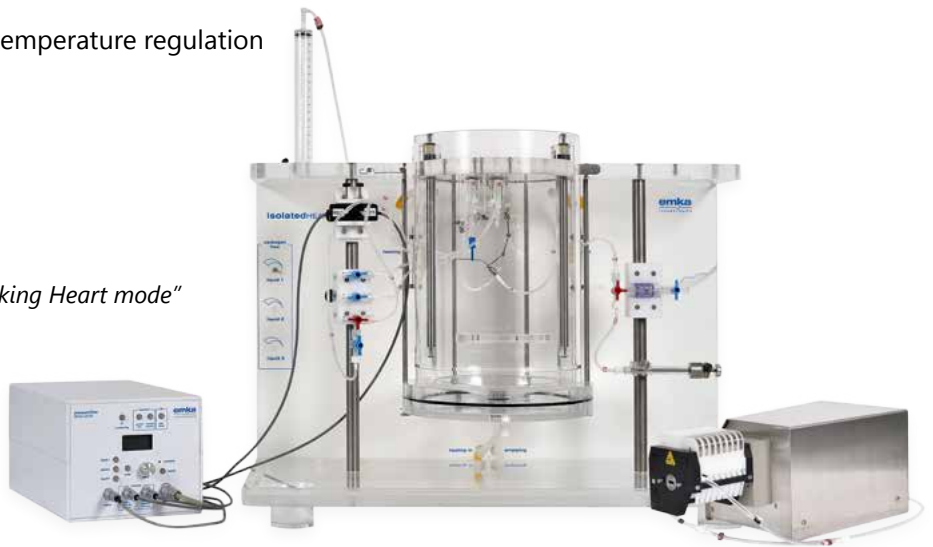
"emkaBATH4, fully automated 4-channel system"

Isolated organ systems

Langendorff and Working Heart system

- » Compact setup for isolated perfused hearts
- » Especially designed for mice and rats hearts - adaptable to rabbits and guinea pigs
- » Perfusion in constant flow or constant pressure modes, for Langendorff model
- » Perfusion in constant pressure in atria, with post charge in aorta, for Working Heart setup
- » Up to 3 different perfusion liquids
- » LVP, ECG, MAP, VAP and temperature measurements
- » Electrical stimulation
- » Very low dead volume, perfect temperature regulation

"Rapid switch from Langendorff to Working Heart mode"



Stimulation & perfusion

Electrical stimulator

- » Constant current or voltage on each of up to 4 channels independently
- » Can be operated manually or from iox2 acquisition software
- » Wide range of stimulation protocols automatically executed
- » Adjustable stimulation parameters (main frequency, stimulation in current or voltage, pulse amplitude, pulse width, pulse polarity, type of stimulation, duration of the train or pulse number in the train)



Perfusion system for mesenteric beds

- » 1 to 4 independent baths
- » Perfusion flow from 5 to 20 ml/min
- » Easy-to-manipulate steel organ beds
- » Adjustable organ bed heights, bath volume and carbogen supply
- » Electrical stimulation possible through stainless steel beds
- » Suitable for any experimental protocol (constant flow, different protocols for each bath, simultaneous or delayed perfusion...)



Acquisition & real-time analysis

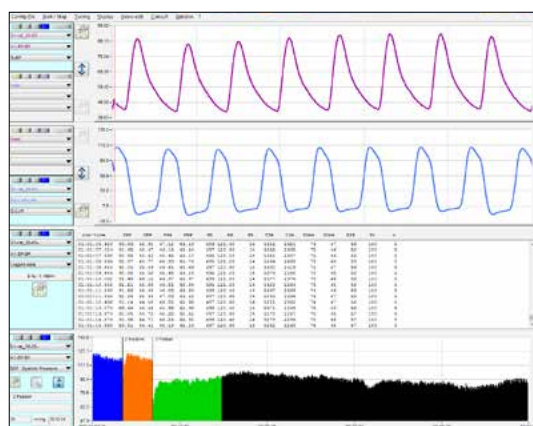
iox2 software



iox2 is a GLP compliant software that allows researchers to acquire, analyze, view, and store data generated during an experiment.

At the heart of iox2 is a library of application-specific analysis modules for real-time signal processing.

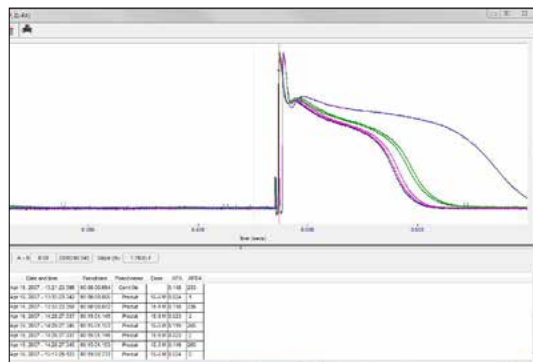
All modules are derived from algorithms widely accepted and validated by the life science research community.



Acquisition & analysis

iox2 software captures up to 200 independent physiologic channels simultaneously from your existing hardware (Transonic flowmeters, DSI™ implants etc.) or from emka TECHNOLOGIES' systems.

- » Real-time signal analysis and display
- » Protocols as experimental guideline or automation
- » External device control
- » Multiple acquisition performed through AD board, USB, Ethernet
- » Synchronized video recording and review
- » GLP modules can be added to provide full GLP compliance.

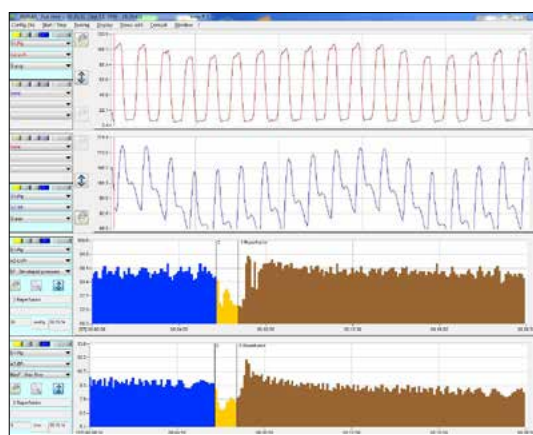


Specific analyzers for real-time processing

For each channel, an analysis module processes your data at a rate of 10 to 50,000 samples / second, to produce a list of predefined parameters.

A range of analysis modules is available for cardiovascular, respiratory, neurologic, electrophysiology, slow and rhythmic signals:

- » Blood pressure & flow, pulse pressure
- » Left ventricular pressure
- » ECG, EEG, EMG
- » Pressure/volume loops, pressure/distance
- » Ventricular wall thickness or segment length
- » Respiratory flow, penh, cough and apnea detection
- » Lung resistance/compliance, double chamber plethysmograph
- » Slow & rhythmic contractile tissue
- » Action potentials
- » Cystometry
- » Temperature, onset of fever, acceleration
- » Power spectrum analysis
- » Nerve
- » etc.



Acquisition & real-time analysis

iox2 software

Flexible data display and review

- » Flexible real-time display: signals, trends, loops, data tables
- » Automated alarms & email generation when relevant physiologic triggers are reached
- » Real-time review of signal with calculated markers & derived parameters

Benefits

- » iox2 is a reference for acquisition and real-time analysis, used for 20 years
- » Easy to use and suited for routine use by lab technicians
- » Multi-purpose & adapts to your needs: cardiovascular, pulmonary, neurology, electrophysiology, *in-vitro*
- » Adapts to your data source, connects to your LIMS



Multi-purpose acquisition & amplification

- » Plug-&-play data acquisition solution
- » usbACQ acquires any amplified analog signals
- » usbAMP acquires and amplifies:
 - biopotential signals (multi-lead or single-lead ECG)
 - signals from strain gauge transducers (force, pressure ...)

Benefits & features

- » Suited for a large variety of preclinical experiments : can be used with isometric transducers for tissue contraction studies, blood pressure transducers, differential air pressure transducers, multi- lead ECG, ...
- » Ideal for medium size setups and for systems needing to be moved
- » Adapted to swap between several computers (incl. laptops)
- » No external settings - all changes in settings are software driven and fully logged
- » Designed for direct USB link to computer running iox2 acquisition software



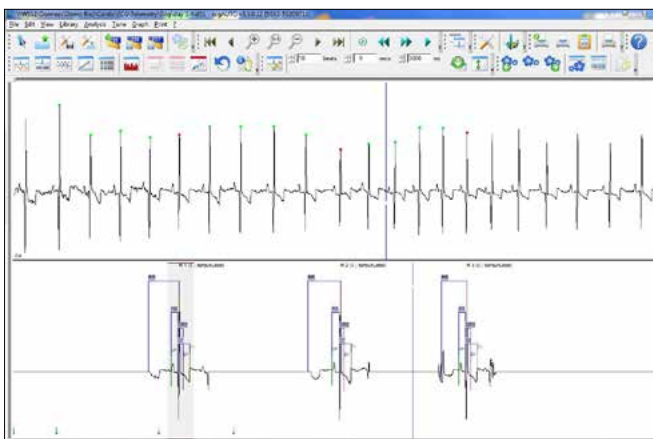
Post-processing analysis

ecgAUTO software for in-depth ECG analysis



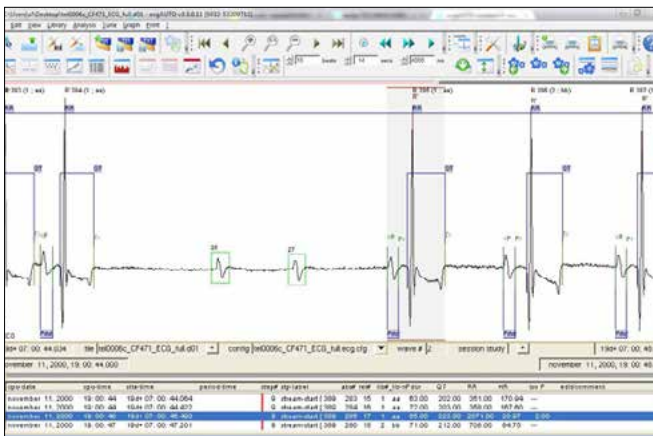
ecgAUTO performs fast, reliable, in-depth ECG analysis. It analyzes normal or abnormal ECG complexes, from any species on any lead, using shape recognition techniques.

This technique uses a library of reference waveforms, built by the user for his specific needs. Analysis is carried out on segments of data («steps») defined by protocol linked to original experimental markers.



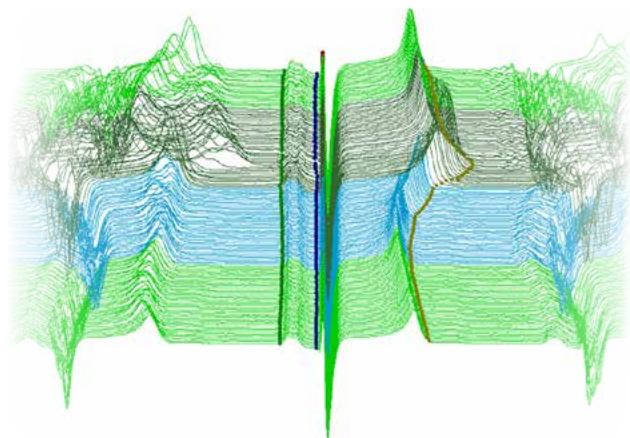
Powerful, fast, reliable ECG analysis

- » Beat-by-beat calculation of intervals (RR, QRS, QT...), amplitude, elevation etc.
- » Any species, any leads
- » Detection of arrhythmia and abnormal events
- » Inter- and multi-lead processing
- » Automated multi-file analysis
- » Predefined/customizable QTc formulas



Comprehensive review features

- » Full list of detected beats, trend graphs
- » Average beats and statistical values per step
- » Holter-type calibrated print-outs
- » Synchronized video review



Advanced features

- » Subject specific QT correction
- » Heart Rate Variability analysis (automatically produces multi-epoch analysis and full Fourier analysis)
- » Isolated P-wave detection
- » Reads non emka data file formats, including DSI™ telemetry data files

Post-processing analysis

ecgAUTO software for non-ECG data

In addition to ECG analysis, ecgAUTO offers different modules for post-acquisition analysis of blood pressure, respiration and CNS data.

NIBP data

Non-invasive blood pressure from oscillometric cuff method:

- » Systolic, diastolic and mean blood pressure
- » Amplitude of pulses
- » Heart rate, pulse transit time, when ECG is also recorded

Respiratory data

Lung volume measurement via respiratory inductive plethysmography:

- » Duration of breath
- » Duration of inspiration/expiration
- » Breathing rate
- » Tidal and minute volume
- » Max flow during inspiration/expiration
- » Thorax-abdomen phase shift, as time or angle

Power spectrum analysis

Easily generate FFT power spectrums with user defined frequency bands:

- » Power in up to 6 adjustable frequency ranges
- » Absolute and relative power values
- » Versatile scheduling of analysis, epoch lengths, overlap factor, windowing

Sleep scoring

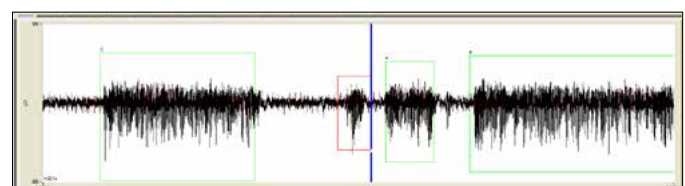
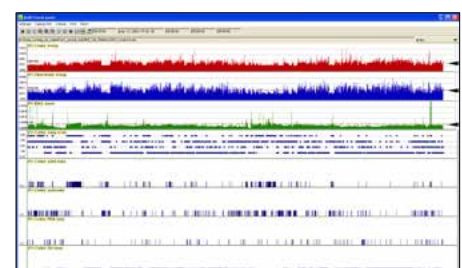
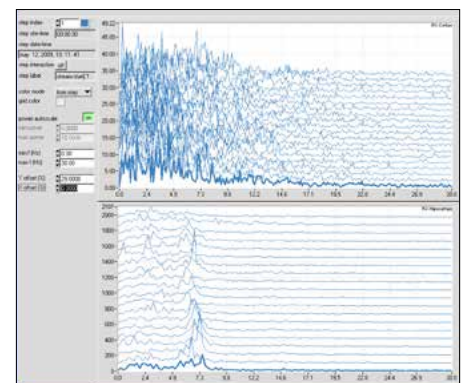
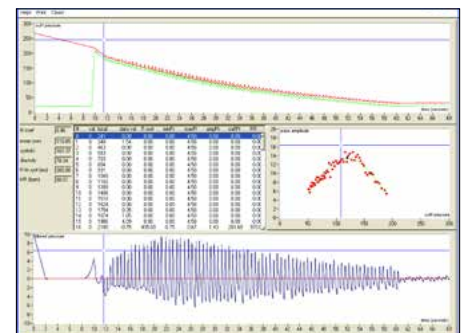
High throughput, automated sleep scoring module:

- » Differentiates between 4 sleep stages
- » Calculates global sleep scores
- » Defines threshold values applicable to any parameter from any input
- » Trend graph displays parameters as well as sleep stages
- » Adjust, on the fly, thresholds and see the effect on sleep scoring
- » Optional video for confirmation of sleep score

Epilepsy seizure detection

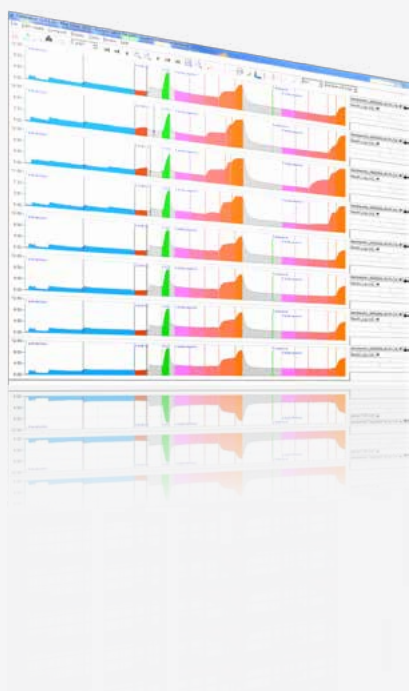
Epilepsy seizures detection from EEG traces:

- » Automatic seizures detection
- » Manual edition of seizures limits is possible
- » Invalid seizures can be deleted
- » Undetected seizures can be created
- » Valid seizures can be exported to text file



Software suite

datanalyst, data post-processing software



datanalyst processes calculated and statistical parameters from files generated by iox2. Data from an unlimited number of experiments is pooled together. Fast and versatile data extraction is performed automatically.

Data reduction

- » Pools subjects into single study
- » Full experiment review
- » Identifies protocol events
- » Exclusion of artefacts

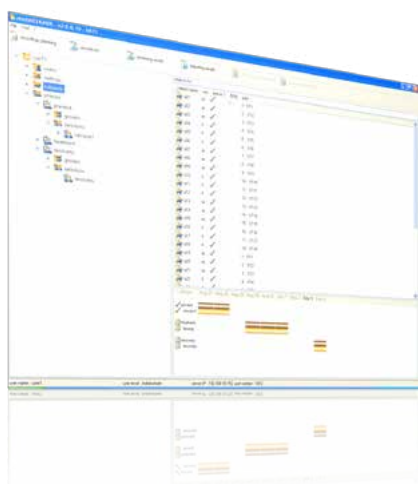
Extraction of key data

- » Edits event markers
- » Automated extraction using protocols
- » Finds min, max, area, kinetics...
- » Performs statistics
- » Computes ED50
- » Results as graphs & tables

Reporting

- » Customized export templates
- » Print reports from datanalyst
- » Export reports as text files

studyDESIGNER, to plan and organize your studies



studyDESIGNER is a high level tool to organize and automate data recording, analysis, control and archiving on large toxicology or safety pharmacology studies.

During recording sessions studyDESIGNER automatically drives iox2 and ecgAUTO software to record and analyze data and send Calculated parameters to its data base.

Designed to make your studies easier and safer

- » Defines study structure and subjects details, pre-test and treatment groups, data collection and analysis settings
- » Acquires data on subjects planned for current sessions or automatically according to predefined protocol
- » Analyses data automatically on all recordings or according to subject or phase
- » Reviews subject or global results
- » Archives results using customized database queries or through secured link to your LIMS or as customized reports

GLP modules

GLP modules of iox2, ecgAUTO, datanalyst and studyDESIGNER include all features for 21 CFR part 11 compliance:

- » Data integrity and accountability
- » Electronic signature
- » Audit trail to record all user operations in a non editable file
- » Audit viewer for rapid review of audit trail
- » User management for user-specific access to software and functions
- » Study management, to tag an identifier on all files used or produced within a given study

Service packages

On-site demonstration, installation, training & support

emka TECHNOLOGIES provides complete solutions for toxicology & safety pharmacology laboratories.

Not only are we committed to delivering products that meet our customers' requirements, we also provide you with the best possible service and support:

- » Live demonstration in customer laboratory
- » System installation and training sessions
- » Fast and reliable support & maintenance contracts
- » Regulatory compliance and validation service



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Let us help you advance your research, contact us !

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