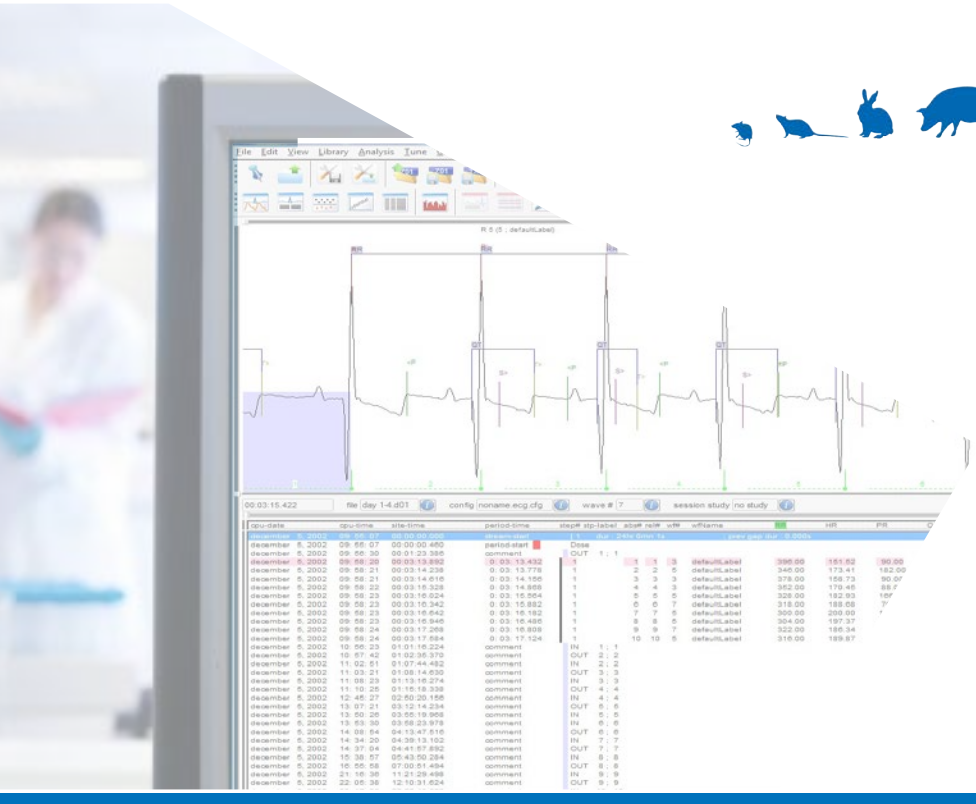
emka TECHNOLOGIES

Systems for preclinical research

Cardiovascular | Pharmacology
Respiratory | Toxicology
Neurology | Physiology



www.emka.fr

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 60 and offices in France, Great-Britain, 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

RESPIRATORY EQUIPMENT PAGES 4-7

- Whole body plethysmograph
- ecgTUNNEL
- Double chamber plethysmograph
- Plethysmograph for anesthetized rodents
- RIP respiration from belts
- tremoFlo P-100
- flexiVent
- inExpose
- Mass flow controller

- Asthma & airway hyperresponsiveness
- ALI, ARDS & ventilator research
- Air pollutants & irritants
- Chronic obstructive pulmonary disease
- Countermeasures
- Drug development
- Fundamental respiratory mechanics
- Pulmonary fibrosis

TELEMETRY EQUIPMENT PAGES 8-15

- easyTEL+ implant
- easyTEL implant
- easyMATRIX
- rodentPACK2
- emkaPACK*4G*

- Arrhythmia
- Heart rate variability
- Heart failure
- Vascular diseases
- Cardiorespiratory studies
- CNS studies (epilepsy, sleep disorders, etc.)

CARDIOVASCULAR EQUIPMENT PAGES 16-17

- nibpSNAPSHOT
- CODA system
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- Pressure and pressure/volume catheters
- Flowmeters

- Thrombosis
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- Pulse oximeter
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- SurgiSuite
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- emkaBATH2 tissue bath
- emkaBATH4 tissue bath
- isolatedHEART system
- Electrical stimulator
- Perfusion system for mesenteric beds

- Gastrointestinal dysfunctions
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- Diabetes
- Edema
- Drug-induced cardiac toxicity
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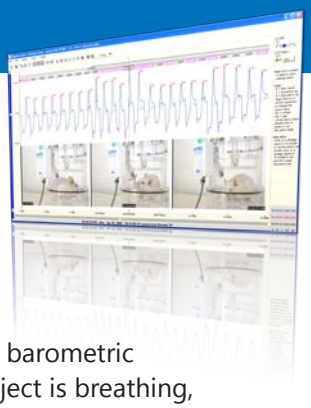
DATA ACQUISITION & ANALYSIS SOFTWARE PAGES 22-27

- iox2 software
- ecgAUTO software
- datanalyst software
- studyDESIGNER software

- data acquisition and real-time analysis
- post-processing analysis
- data reduction and reporting
- study management



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, SPO_2...) or blood sampling following drug injections
- Chamber for neonates
- Possible combination with implanted telemetry for cardiorespiratory studies (ECG, blood pressure)

ecgTUNNEL for cardiorespiratory studies on conscious restrained subjects

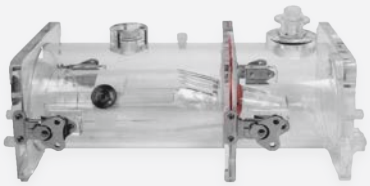
- Gets 6-lead ECG signal in a few seconds with 4 electrode pads
- Optional respiration measurement (like in whole body plethysmograph)

See “Cardiovascular equipment” section page 16 for more details.

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
- Efficient screening

System configurations

- Can be used in head-out configuration
- Aerosol or gas exposure
- Real resistance/compliance measurements can be obtained with pressure signal from a telemetry implant

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...) and vital signs monitoring

Systems for large animals

RIP respiration from belts

- lung volume measurement via respiratory inductive plethysmography (see “Non-invasive telemetry” section page 14)

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 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.

scireq
an emka TECHNOLOGIES brand

Broadest range of measurements in a single platform

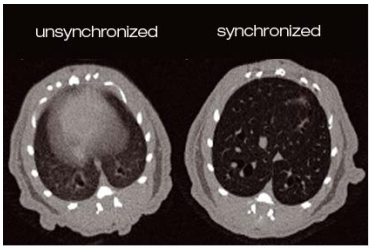
- Single frequency FOT (resistance/compliance)
- Broadband FOT - distinguishes between airway & tissue resistance
- Pressure-volume loops - capture the quasi-static mechanical properties of the respiratory system
- Forced expired manoeuvre (FEV) - attempt to mimic clinical spirometry in preclinical research
- Delivered dose - easily and accurately compare results across subjects, groups, studies and even other labs.
- Lung volumes - determine total and residual lung volumes (TLC/RV)

Features & benefits

- Modularity - interchangeable modules for different subject sizes (from 3g to 1kg)
- Reproducibility - standardized and automated protocols
- Accuracy - sensitive device offering precise control of experimental conditions

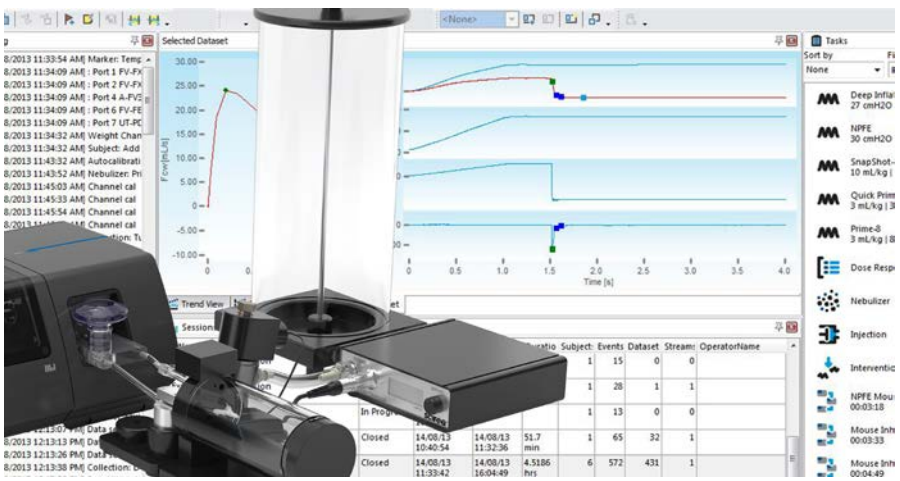
System configurations & extensions

- 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 - can be integrated with CT scanners
- Vital signs monitoring (body temperature, heart rate and 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, as well as automated generation of cigarette smoke and aerosols.

Features & benefits

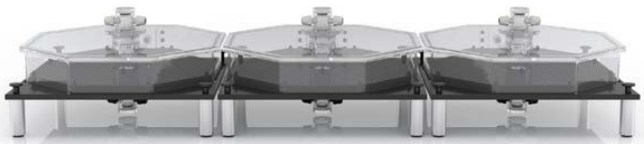
- Compact size and high level of integration
- Fully automated computer and software control
- The system's low internal volume allows for unintentional dilution of precious compounds and aerosol rain-out is captured to allow users to re-use their costly compound

System configurations

- Nose-only or whole body exposure platforms available for mice and rats
- 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 adaptor
- Aerosol generation with the Aeroneb 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.



Mass flow controller for gas mixture

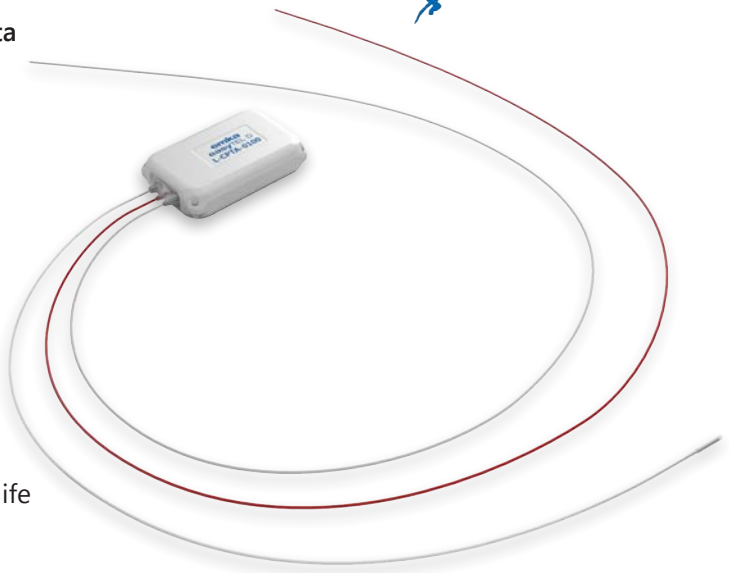
- Deliver a specific gas mixture to animal chamber
- Ideal for hypoxia, hyperoxia, hypercapnia evaluation
- iox2 software performs aquisition and controls the mass flow controllers (modify the composition of the gas mixture in real time, directly from iox2)

Implantable telemetry for large animals

easyTEL+ implant

Continuous, real-time measurement of physiological data

- ECG
- EEG
- Temperature
- Blood pressure
- Breathing rate
- Acceleration from 3 axis accelerometer (activity)



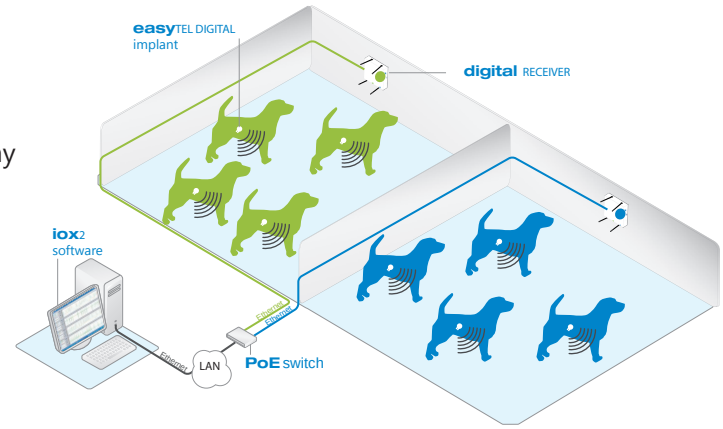
Features & benefits

- 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 180 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 for implant detection & configuration
- Simultaneous monitoring from multiple distant PCs
- Automatic reconnection if subject is momentarily away from receiver or after network failure

- Implants price very competitive
- Implants can be re-implanted as long as battery lasts
- No refurbishment and no associated costs or delay



ECG and blood pressure signals from dog acquired in iox2 software software

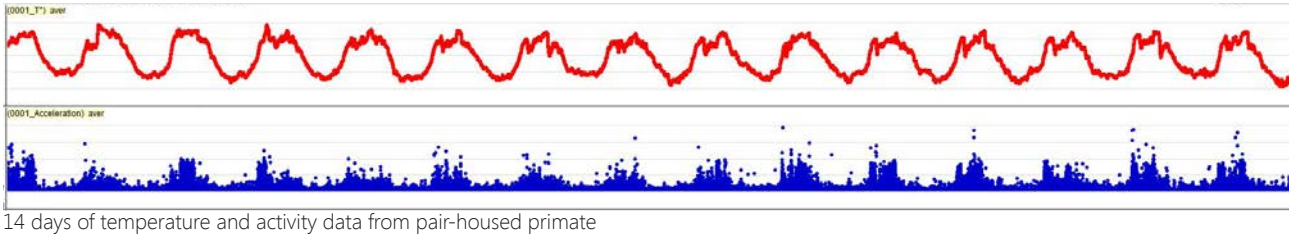
Implantable telemetry for large animals

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 (flashing display, audio tone or send 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	Heart rate	Breathing rate	Full ECG	EEG	Pressure	Temperature	Activity	Battery life (days)	Size (mm)	Weight (g)
TA						1	1	180	51x35x14	29
CTA		yes	1			1	1	100	51x35x14	29
HBTA	1	yes				1	1	130	51x35x14	29
EETA				2		1	1	90	51x35x14	29
PT		yes			1	1		110	51x35x14	32
CPTA		yes	1		1	1	1	100	51x35x14	32

- **HBTA** model is ideal for biodefense studies
- **CPTA** model is ideal for efficacy and safety pharmacology studies
- **PT** model is ideal for minimally invasive pressure studies and can be combined with emkaPACK4G

Implantable telemetry for rodents

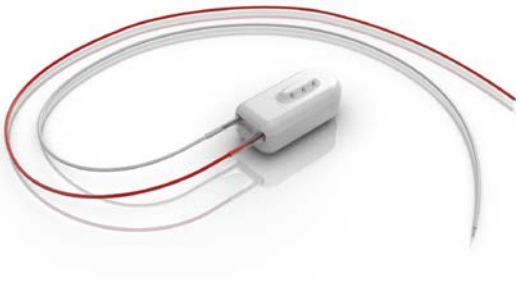
easyTEL implant

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 infrasctructure

- 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	1.8 cc	3.3 g
	TA		1	1	3 months	1.8 cc	3.3 g

easyTEL-M	Models	ECG	EEG	Temperature	Activity	Battery life	Dimensions	Weight
For animals>100g	CTA	1		1	1	8 months	5.4 cc	8 g
	ETA		1	1	1			
	TA			1	1			

Implantable telemetry

easyMATRIX, link from telemetry implants to emka TECHNOLOGIES software suite

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

Features & benefits

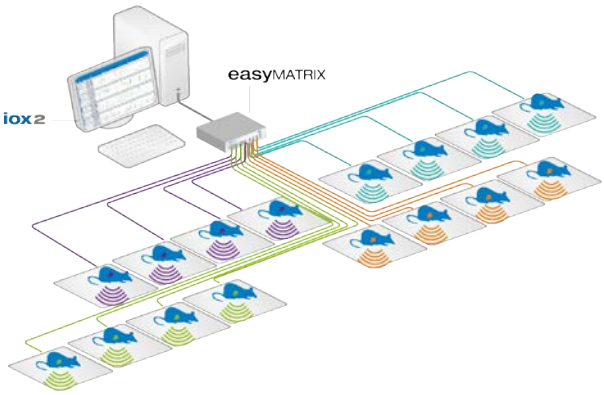
- Contains its own ambient pressure transducer
- No need of OpenART™ or acquisition card in computer
- Only requires connection to existing receivers and to a PC (USB & Ethernet)
- Accurate synchronization of signals from different sources (i.e pleural pressure from implant and respiratory flow from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

System configuration

A single easyMATRIX can handles:

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

Up to 4 easyMATRIX can be connected to a single computer



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

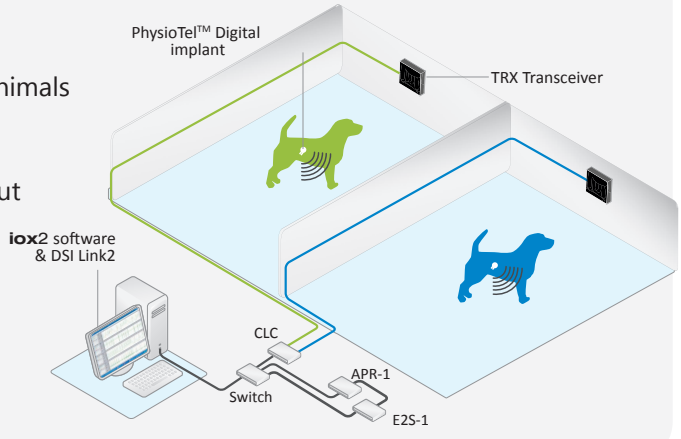
DSI Link2, dynamic link between iox2 software and DSI implantable telemetry

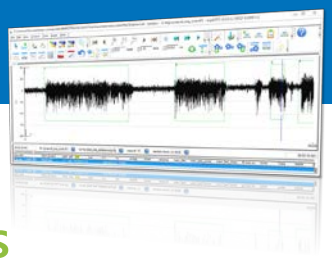
- Acquires telemetry data from DSI PhysioTel™ Digital and HD implants
- Performs real-time analysis in iox2 software

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

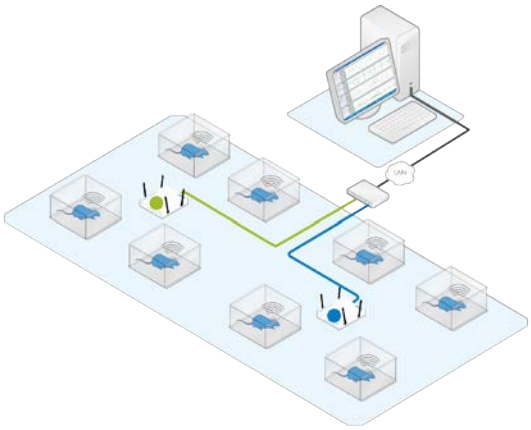


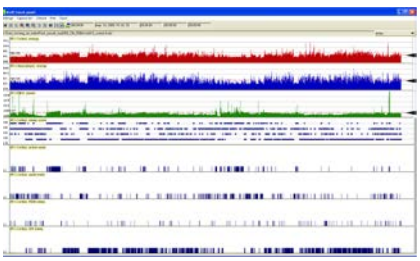


Telemetry for neuro cardiovascular studies

rodentPACK2, 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

- One receiver for 4 animals
- smartTOOL for transmitter configuration

For CNS studies:

- A skull connector permanently implanted
- A transmitter, connected to skull implant only during recordings

For non-invasive ECG studies:

- Transmitter, fitted with miniature ECG cables and skin electrodes, is housed in pocket of custom design jacket

Applications

- Epilepsy
- Sleep disorders
- etc.

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

emkaPACK*4G* 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)

Features & benefits

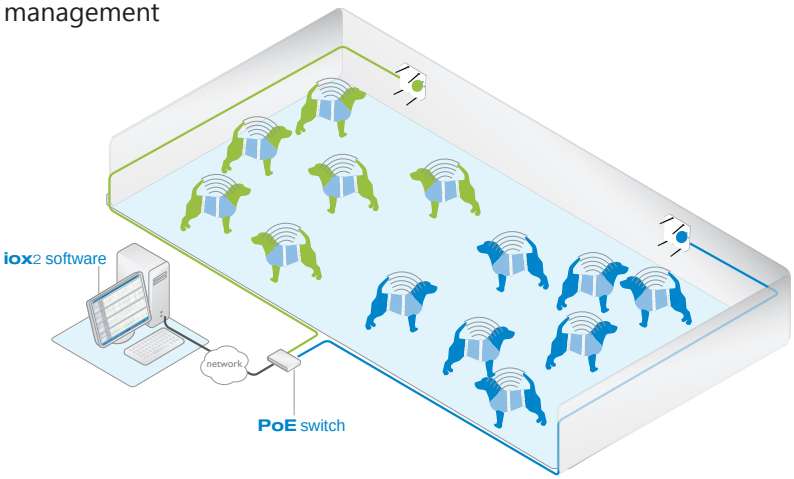
- Non-invasive
- For freely moving large animals, such as dogs, primates, sheep, pigs and horses.
- 32 to 48 subjects per room, group or single housed
- Information on lost electrode & low battery level
- 10 m transmission range
- 48 to 72 hours on same batteries
- Each signal available as an optional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

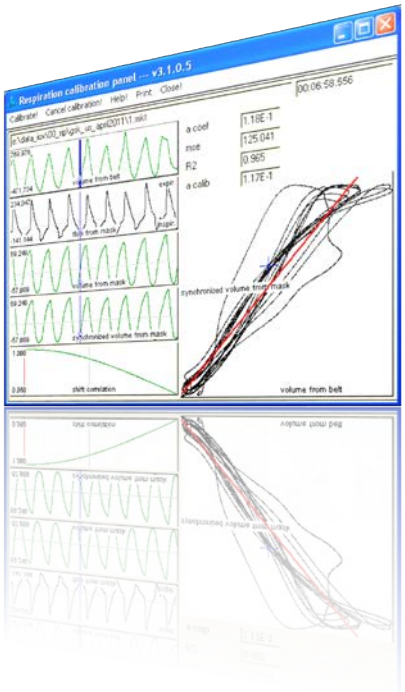
emkaPACK*4G* optional modules

ECG measurement

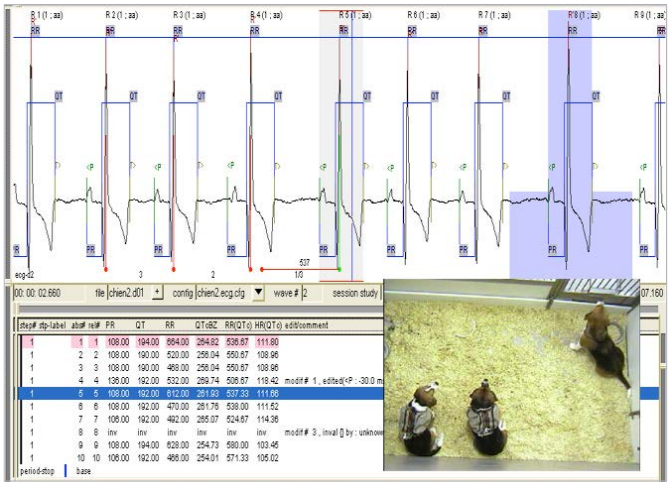
- 9-lead ECG from external electrodes
- Gold standard analysis for any species, any lead

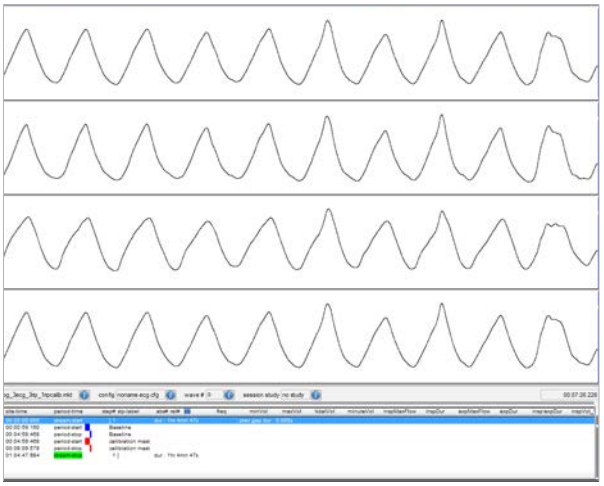
RIP respiration from belts

- 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.



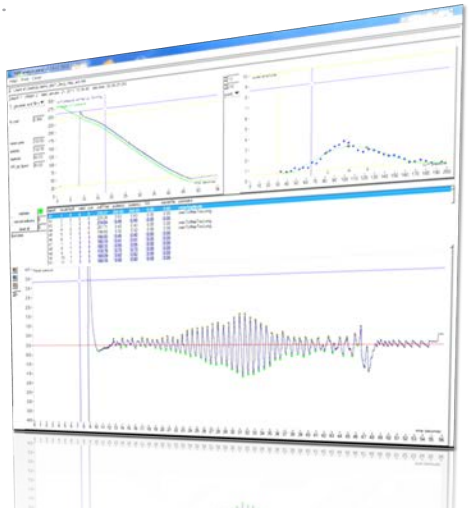


Non-invasive telemetry

emkaPACK*4G* 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



bptVAP, vascular access port

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

Temperature

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

Specific jacket and t-shirts design

- ¾ length or full lenght 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

Non-invasive systems

nibpSNAPSHOT, for large animals

"Ideal for Toxicology center using large animals"

Non-invasively measures oscillometric blood pressure (NIBP) and 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
- Immediately trigger another measurement cycle or adjust inflation pressure and deflation speed

CODA™ for rodents

- Non-invasive blood pressure from mice and rats
- 6 parameters measured simultaneously: systolic, diastolic, mean BP, heart rate, tail blood volume & blood 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
- Clear acrylic holders provide unrestricted breathing and allow complete visibility to the researcher
- Seven holder sizes available
- Tail is unrestrained to allow for regular tail movement

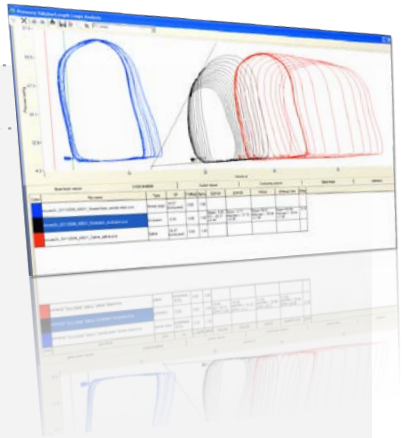
ecgTUNNEL for cardiorespiratory studies

- 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
- Each model accommodates neonate to adult subjects (interchangeable tunnels)
- Non-invasive : no anesthetic and no surgery
- Quick and easy setup
- Rapid adaptation
- Plug-&-play data acquisition (integrated amplifier, USB link to PC)

Catheters & flowmeters



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)
- Variable Segment Length catheters (4 volume electrode options) for more flexibility in matching ventricle sizes
- Single and multiple pressure and volume measurement

Traditional conductance vs Improved admittance modes

The Scisense ADV500 Pressure-Volume System provided by emka TECHNOLOGIES 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 ventricule) and magnitude in real-time, creating pressure-volume loops. No need of saline injection. Continuous and automatic correction of parallel volume.

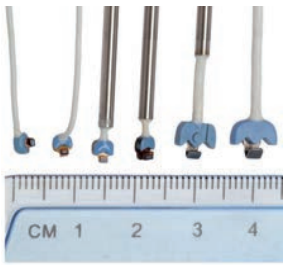
Acquisition and complete analysis within iox2 software

- 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
- Linear or nonlinear regression is used for curve fitting

Flowmeters - Gold Standard

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

- Extensive range of probes available to suit your needs
- Measure volume flow through arteries, veins and ducts of different species (diameter ≥ 0.25 mm)
- Tubing and perfusion applications also possible
- Wide range of Laser Doppler Probes available to perform microvascular perfusion measurements in approximately 1 mm^3 of tissue



Vital sign monitoring

PhysioSuite, vital sign monitoring

Pulse oximeter & heart rate monitoring

- Clinically validated
- Stand-alone system
- Heart rate, SpO_2, respiratory rate

Temperature monitoring and homeothermic control

- Homeothermic controller
- 2 warming pads
- 2 temperature sensors

End-Tidal CO_2 Monitoring

- Real-time capnography
- 5 safety alarms
- Sidestream sampling

Automatic ventilation

- Fully Automatic: enter animal's weight, press RUN
- Neonatal mice to 500g rats
- Control ventilation by pressure or volume

Pulse oximeter for mice and rats

Fits in the palm of your hand:

- Easily integrates into your anesthesia set-up

Clear display of heart rate and pulse oximetry:

- Quick view of vital signs allows you to focus on your animal

Visual alerts to confirm sensor placement:

- Identify and maintain accuracy at the sensor site

Surgery

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
  (replaces traditional canister-style vaporizers)
- Digital automatic ventilator, both volume & pressure controlled
- Pulse oximeter & heart rate monitor

SurgiSuite, 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

RoVent, small animal ventilator

- Ideal for mice, rats and guinea pigs up to 1,500 g
- Fully automatic
- Volume control and pressure control
- Touchscreen operation
- Safety alarms

Tissue bath setups

Isolated tissues and microvessels

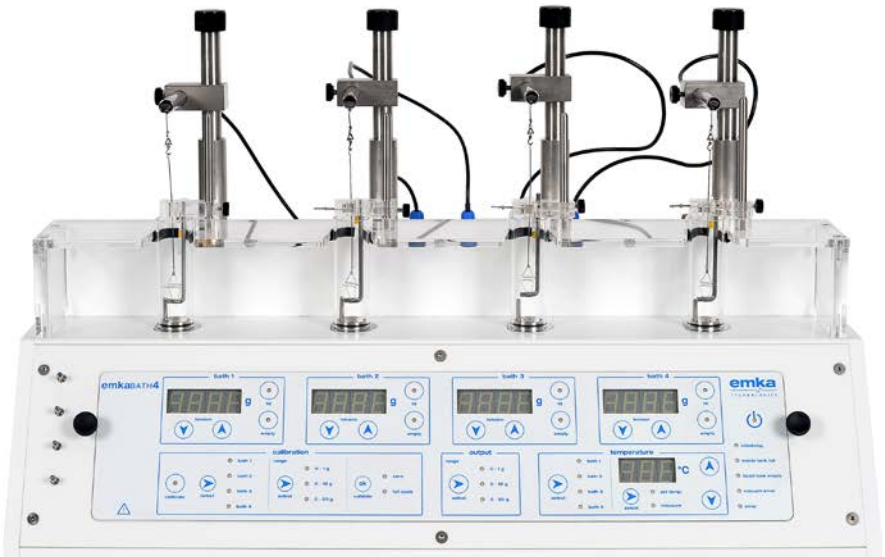
- Compact & integrated benchtop setups
- Ideal for aorta, trachea, papillary muscles etc.
- Bath temperature display and control
- Physiological liquid heated in-line - no need of extra water heater
- Available with 2 models of isometric transducers (possible adaptation of isotonic transducers)
- Can 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



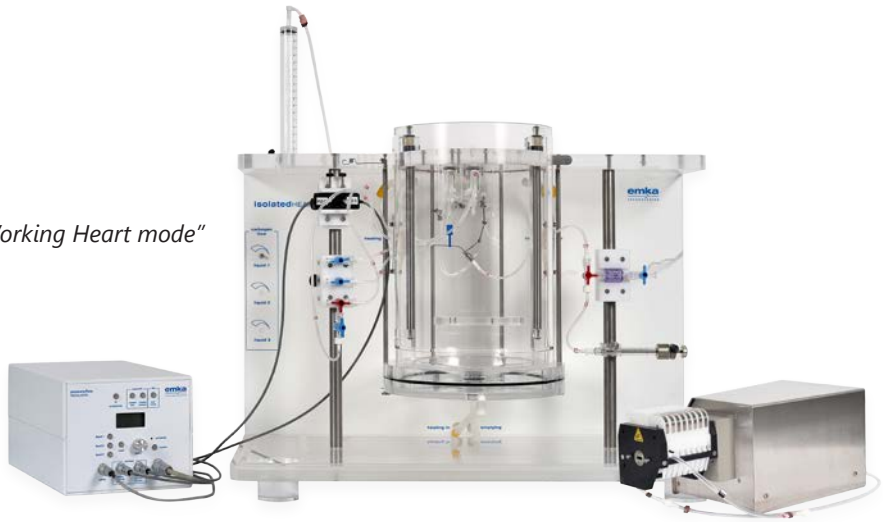
"emkaBATH4, fully automated 4-channel system"

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 and 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 created & automatically executed
- All stimulation parameters are adjustable (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...)

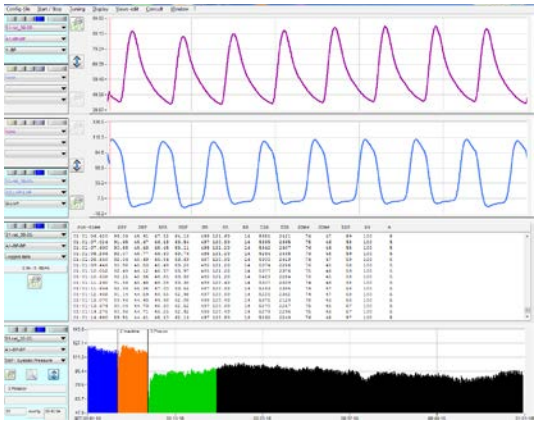
Acquisition & real-time analysis

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.

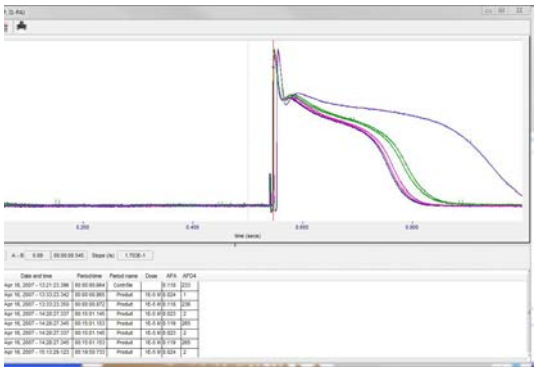
All modules are derived from algorithms widely accepted and validated by the life science research community.



Aquisition & 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.

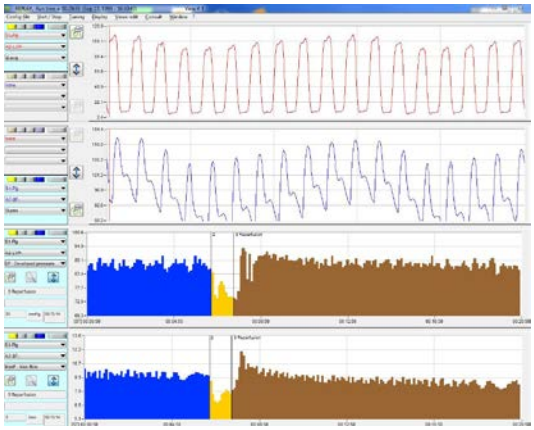


Specific analyzers for real-time processing

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

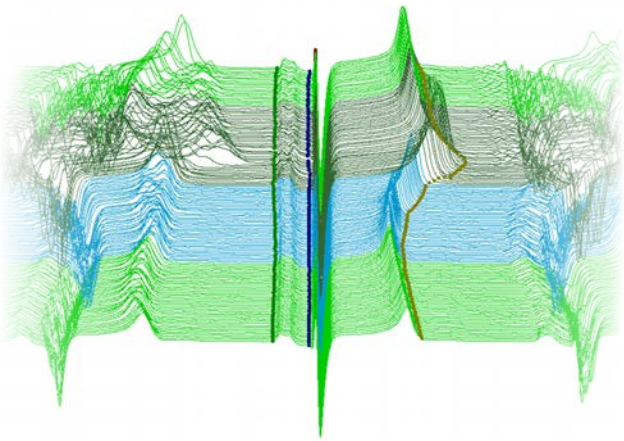
- Suited for a large variety of preclinical experiments : can be used with isometric transducers for tissue contraction studies, blood pressure transducers, differential air pressure transducers, multi- lead ECG, ...
- Ideal for medium size setups and for systems needing to be moved
- Adapted to swap 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 techique 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

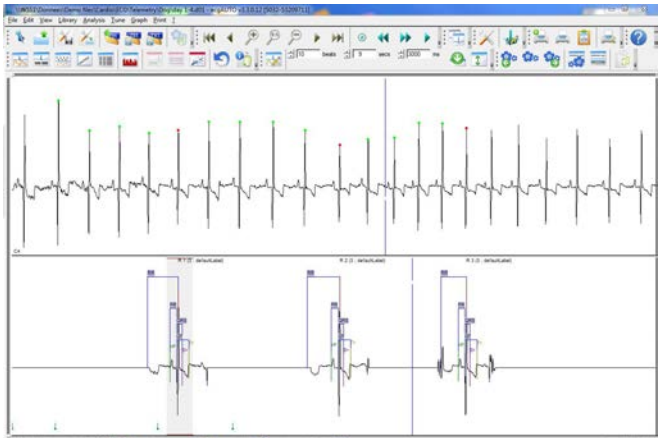
» Beat-by-beat calculation of intervals (RR, QRS, QT...),
amplitude, elevation etc.
» Any species, any leads
» Detection of arrhythmia and abnormal events
» Inter- and multi-lead processing
» Automated multi-file analysis
» Predefined/customizable QTc formulas

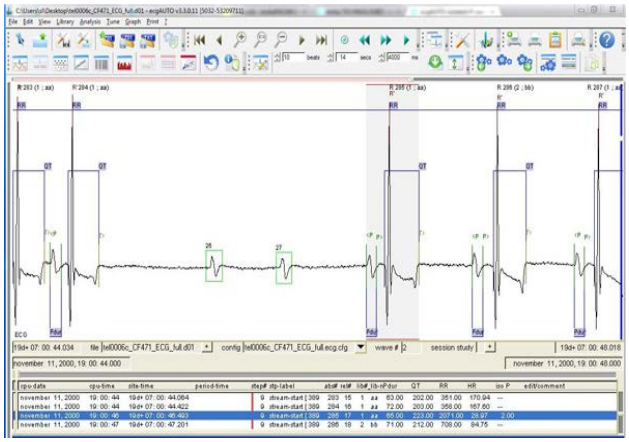
Comprehensive review features

» 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

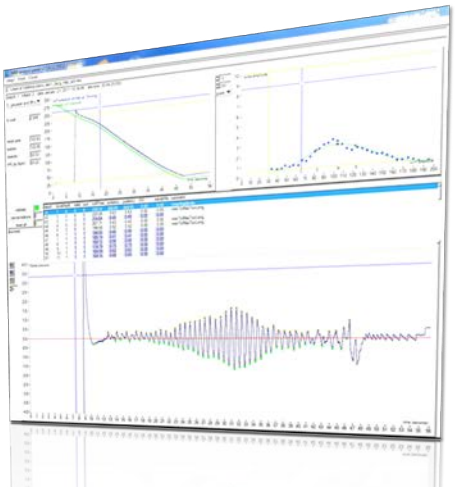




Post-processing analysis

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

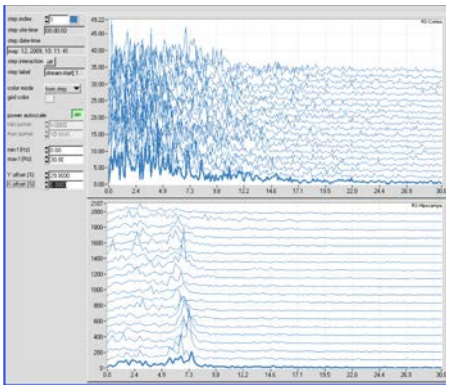
Non-invasive blood pressure from oscillometric cuff method:

- 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:

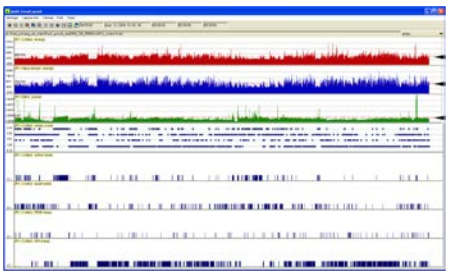
- Duration of breath
- Duration of inspiration/expiration
- Breathing rate
- Tidal and minute volume
- Max flow during inspiration/expiration
- Thorax-abdomen phase shift, as time or angle



Power spectrum analysis

Easily generate FFT power spectrums with user defined frequency bands:

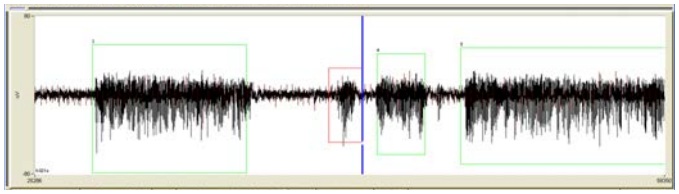
- Power in up to 6 adjustable frequency ranges
- Absolute and relative power values
- Versatile scheduling of analysis, epoch lengths, overlap factor, windowing



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



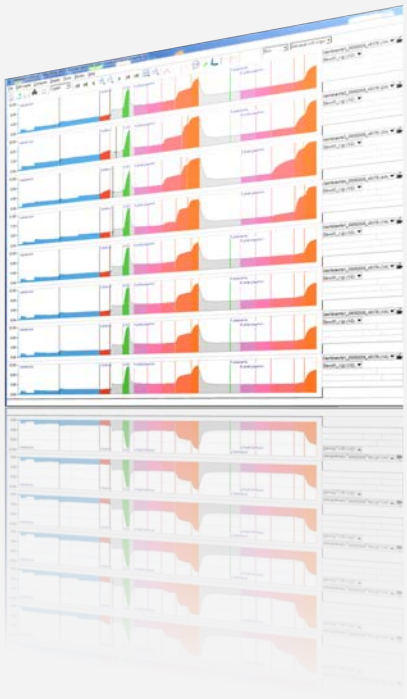
Epilepsy seizure detection

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

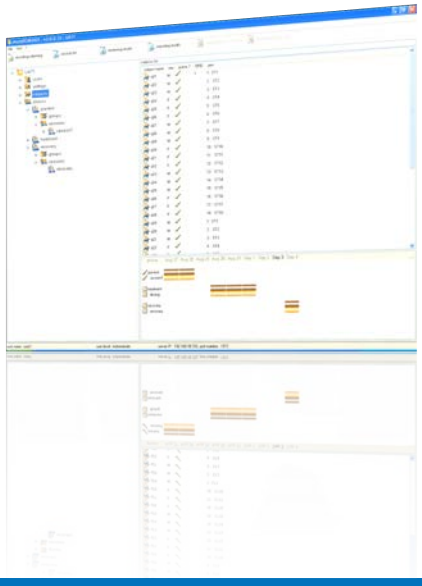
Reporting

- 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

Let us help you advance your research, contact us !

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