



Introduction

MARTA (Monitoring Animals in Research with Technology and Application) uniquely combines real-time monitoring of vital signs and the collection of high-quality monitoring data with utmost care and minimal distress for animals. MARTA detects and measures heart rate, breathing rate and temperature without contact in anaesthetised laboratory animals. MARTA is designed to bring high sensitivity, reliability, and flexibility to any workflow.

mice used for scientific purposes annually

500 000

in Switzerland

10.5 M

in the EU (& Norway)

111 M

in the US

192 M

globally

Innovative high-quality research is crucial to increase the understanding of the causes leading to neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, and dementia. With life expectancy on the rise, it is important to understand the origins and to develop new treatments. Animals are still needed in basic research. Over 95% of animals used in research are mice & rats.

We save you animals, time and money

SAVINGS PER YEAR*

**65
mice**

saving
animals

**17030
CHF**

saving
costs**

**208
hours**

saving
time

* The savings are calculated for a lab of 10 people performing daily research (1 experiment/person/day).

** The saving costs include: working hours CHF 7280; mice (price incl. housing) CHF 6500; material CHF 3250.

The protection and welfare of laboratory animals is an area covered by the Swiss and EU legislation. The 3R principles (Replace, Reduce and Refine) must be always considered systematically while conducting research. Thus, close monitoring of vital signs is increasingly important to maximise the likelihood of successful surgical outcomes. MARTA is the first refinement product on the market fulfilling the stipulated quality standards.

high sensitivity and reliability
MARTA compared with ECG-measurements

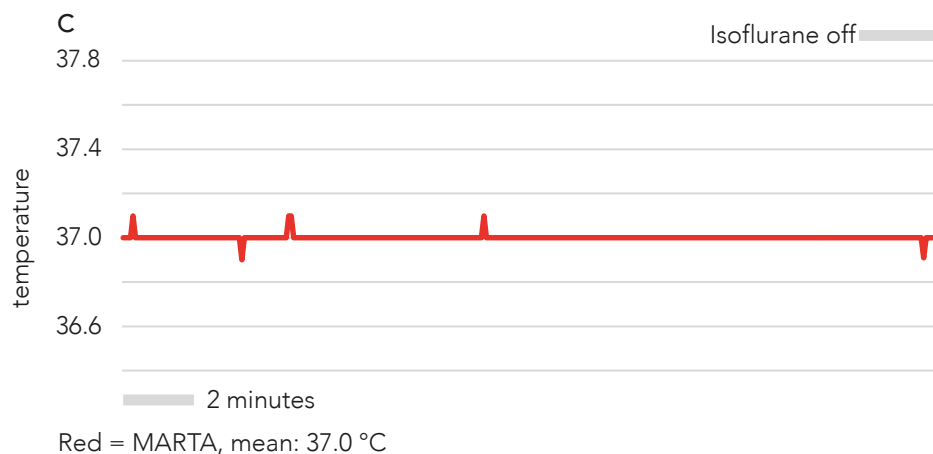
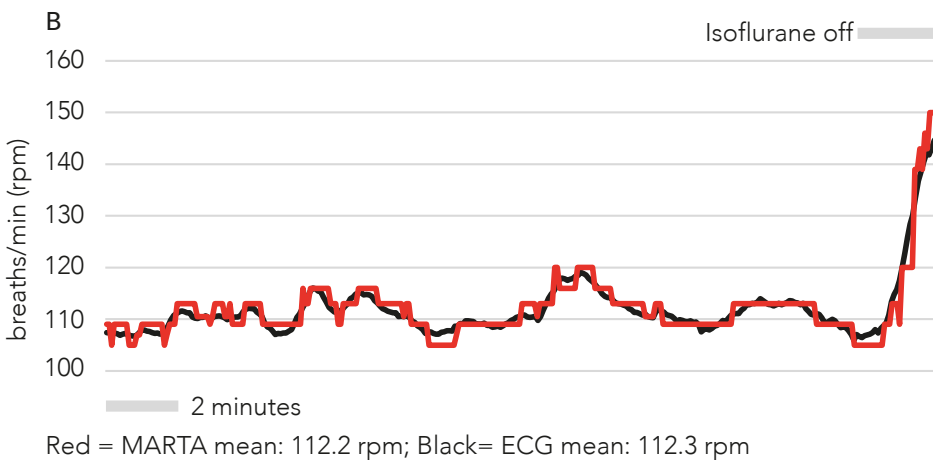
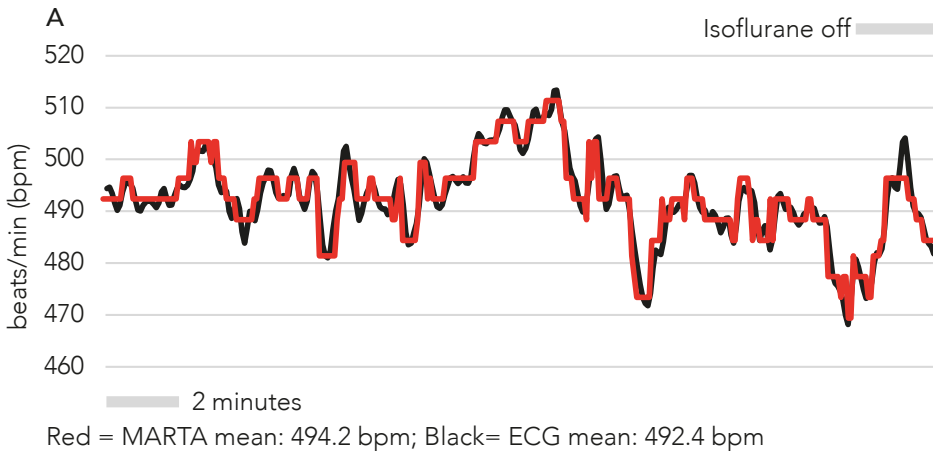
Application

basic research

neuroscience

imaging

surgeries



The figures A-C show an example data set of heart rate (bpm) and breathing rate (rpm) and temperature from C57BL/6 mice with 2 % isoflurane anaesthesia. Statistical analysis showed a calculated deviation for heart and breathing rate with MARTA of <1 % compared to ECG (15 recordings; N=5, C57BL/6). MARTA is a novel way to measure heart & breathing rate less invasively during all steps of animal studies.

MARTA is designed for in-vivo studies such as surgeries and/or imaging with anaesthetised mice. For stereotaxic surgery, MARTA Pad is compatible with the *Kopf Instruments Model 900 Small Animal Stereotaxic Instrument*.

Preferably, MARTA is used with *isoflurane anaesthesia* (1.5-2 %). Inhalant anaesthetics are strongly recommended in mice to finely regulate, change anaesthetic depth, and minimize experimental variables due to animal distress.

MARTA Pad

You can place animals on MARTA Pad and start real-time monitoring instantly. Vital signs such as heart and respiration rate are continuously monitored, and the animals' temperature is regulated during all steps of your animal studies. There is no distortion due to separate sensors for heart and breathing rate.



heart rate

390-900 bpm

Expected heart rate for mice is between **400-550 beats/minute** and is dependent on strain & age.



breathing rate

37.5-225 rpm

Expected breathing rate for mice is between **50-150 breaths/minute** and is dependent on strain & age.



temperature

30-45 °C

Expected body temperature for mice is between **36.5-37.5 °C**.

Technical Data

length	162.0 mm
width	92.0 mm
height	31.2 mm
weight	625 g
service life	4 years
battery lifetime	3 h
screen size	1.54"
dimensions	45.24 x 29.14 mm
resolution	128 x 64 pixel
screen	Oel Display Modul
touch fields	8
monitoring starting time	16 sec



YES

put and play
 waterproof and fully sterilisable
 CE conformity for medical devices 60601

NO

electrodes
 optical sensors
 extra monitors

Tested mouse strains

C57BL/6
 BALB/C
 RjOrl:SWISS

Animal positions

belly-down
 side (autumn 2023)
 belly-up (autumn 2023)

MARTA Pad and MARTA App are communicating via Bluetooth. Pair your smartphone, tablet, or computer with your MARTA Pad. Once your devices are paired, MARTA Pad will start automatically with the vital signs data transfer.

perform unique research with unique products
key features and benefits

MARTA App

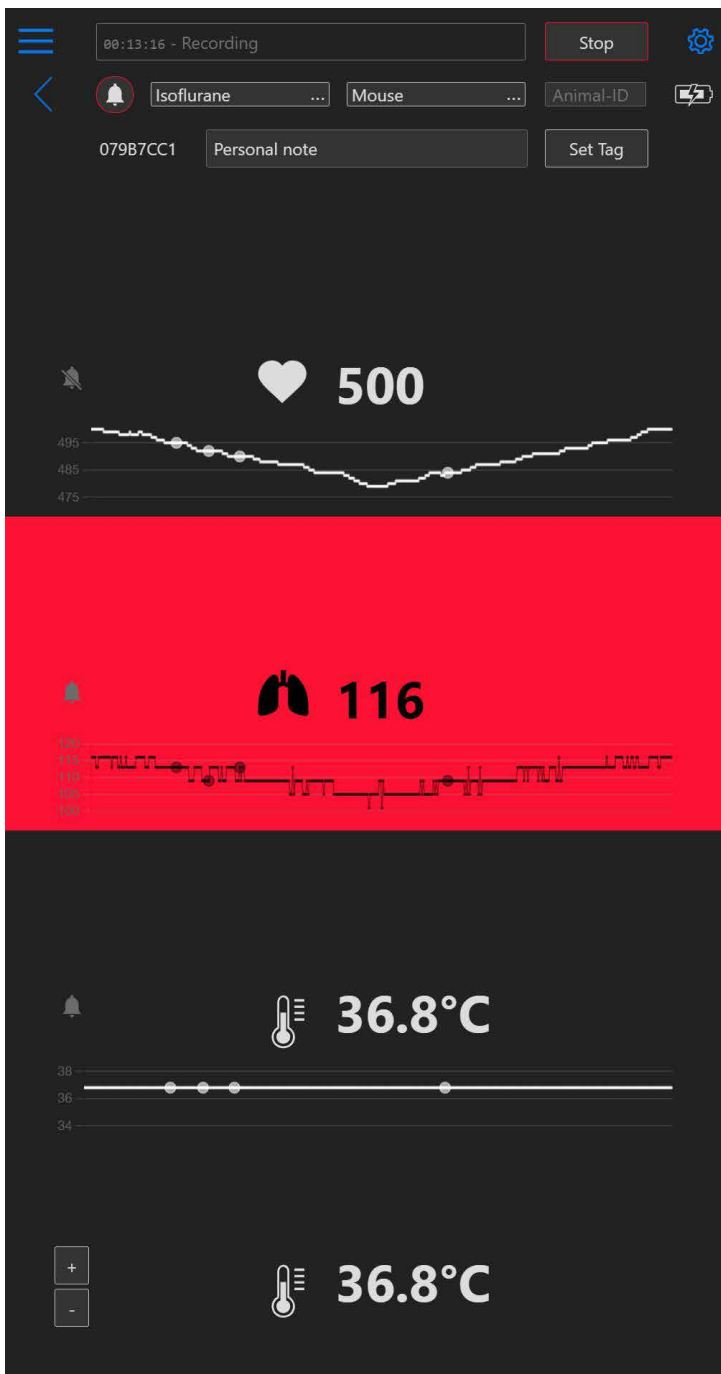
MARTA App visualises, collects, stores and exports sensitive high-quality monitoring data (heart rate, respiration rate and temperature) with a few clicks. You can start collecting data within seconds and use the exported data for instant analysis. A virtual assistant supports you before, during and after animal studies and reports anomalies with an alarm signal. This allows you to recognise animals' distress better and to improve the animals' wellbeing.

YES

sensitive research data
data stored securely and locally
own server infrastructure in Switzerland
account security: two-step-verification

NO

paper-based data collection
incomplete monitoring
loss of vital signs data for further analysis
and publications



Monitoring overview

top row (left to right)

Three lines: list with recent recordings for instant export as .csv files. Real-time recording in hours:minutes:seconds. You can tap «Stop» to stop the recording. Cog wheel: Settings: Here you can set your alarm sets with your own bandwidths for each vital sign (heart rate, respiration rate and temperature).

middle row (left to right)

Red circle with bell: virtual assistant is on. You can choose your anaesthesia protocol, your animal species, and an animal ID. Battery status.

bottom row (left to right)

Your MARTA ID. You can add personal notes by setting tags.

Real-time data collection

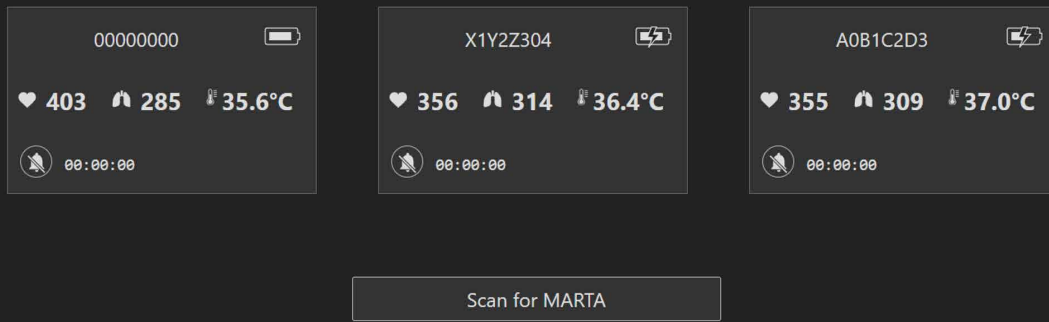
Heart rate, breathing rate and temperature are shown over time. The dots on the curves show your added personal notes.

Red area: The virtual assistant detects deviating vital signs (here breathing rate) beyond the defined bandwidths and warns with an acoustic and visual alarm signal. You can stop the acoustic alarm by tapping on the red area. The visual alarm will stay active until the vital signs are back within the defined bandwidths.

You can manually change the temperature by tapping «plus» or «minus» to raise or reduce the temperature of your MARTA Pad.

With MARTA App you always have control over your animals' vital signs. You can focus on your work because MARTA does the rest.

perform unique research with unique products
key features and benefits



You have the possibility to pair several MARTA Pads with MARTA App. The pads are displayed in individual tiles in the pad overview. You can switch between two views. There is a tile view and a list view.

MARTA Box

MARTA Box can be placed on MARTA Pad for pre- & post-anaesthetic monitoring. Once animals are fully anaesthetised, MARTA Box can be removed easily from MARTA Pad. Animals do not need to be touched or moved. MARTA Box is leakproof and sterilisable. It is compatible with all commonly used gas mixtures. The inlet and outlet holes are compatible with 6 mm and 22 mm tubes.



MARTA Rec

The stainless-steel probe must be inserted into the animal and the micro-USB plug must be connected to MARTA Pad for closed loop temperature control. MARTA Rec guarantees an accuracy of 0.1°C. It is fully sterilisable. MARTA Rec is only compatible with MARTA Pad.



What costumers say about MARTA

„MARTA made my daily research so much easier. MARTA is an all-in-one put and play solution for vital measurements. It allows observing the animal without having visual contact. MARTA is more stable under anaesthesia than other products since isoflurane levels can be adapted upon vitals monitored by MARTA.“ (researcher, UZH)

„MARTA is easy to use without any cables. It allows moving the animal without losing the monitoring. The reacquisition of monitoring happens in a few seconds. MARTA solved what was not doable before. We have better survival and recovery rates for animals in our studies and a better CoC (Culture of Care).“ (head of lab, ETH)

„MARTA is easy to use and to clean. MARTA reacts promptly to changes in heart and breathing rate. With MARTA, we don't have to write down data anymore. Data is stored and instantly ready for analysis and publications. It solved general monitoring problems with previous equipment.“ (researcher, UZH)

„Preparation time is less time consuming, and animals are less stressed. The temperature is more stable. We use less animals since adopting MARTA.“ (researcher, Swiss pharmaceutical company)

Choose well, choose MARTA
nobody monitors like MARTA

Vigilitech has the Swiss Label for quality Swiss products and services. We manufacture our products and services such as software, digital services, and hosting exclusively in Switzerland and therefore meet the Swiss quality standards. MARTA also has the CE conformity for medical devices 60601.



Swiss Label



Swiss digital services



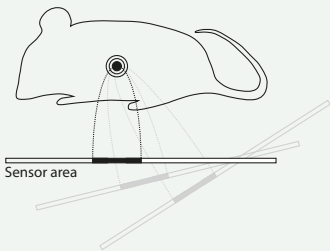
Swiss hosting



Swiss made software



CE conformity



Until now, animals have been monitored through direct skin contact with electrodes or optical sensors. Vigilitech has developed a novel capacitive sensor technology for monitoring of vital signs without contact. The technology is patented.

VIGILITECH 

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our products at the heart of animal welfare
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