



Biotelemetry System

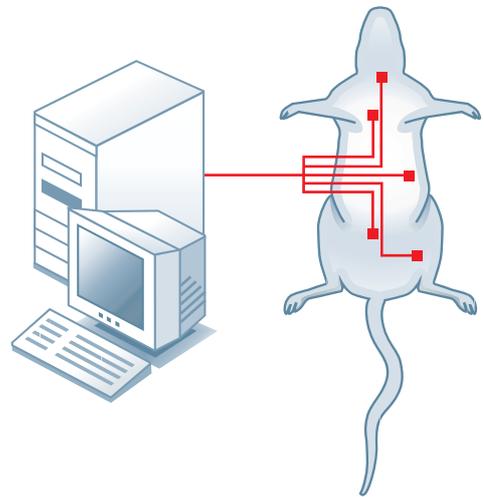
*Telemetric system
for wireless
monitoring of vital
parameters
and collecting
physiological data*



Reliable and time-proof monitoring of physiological parameters on conscious laboratory animals

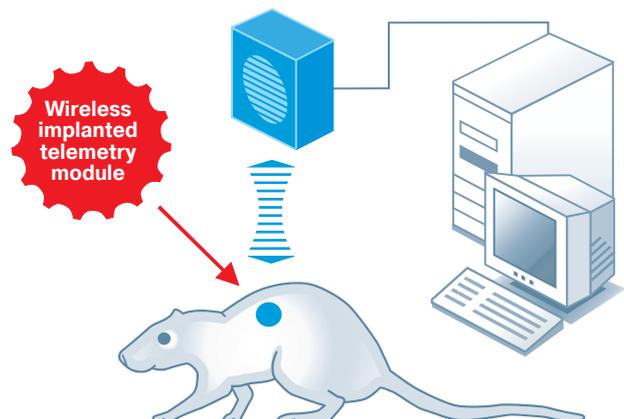
Old way:

- ▶ Direct measuring of physiological parameters
- ▶ Unreliable monitoring data



New way:

- ▶ Study of animals with minimal stress in their normal housing
- ▶ High quality of monitored data



Solution Description



OT Solutions R&D team and the scientists of the Lomonosov Moscow State University's School of Medicine (Russia's number 1 university) have developed a prototype of biotelemetry system for remote wireless monitoring and collecting physiological data on conscious laboratory animals.

Biotelemetry is essential to bio-medical research: In the pharmaceutical industry, biotelemetry is applied for research purposes as well as in drug development. Biotelemetry can be used to reveal efficacy and pharmacodynamics of a compound or of a possible new drug.

- ▶ In research, biotelemetry is a useful tool for efficacy testing when used in combination with a disease model.
- ▶ In development, biotelemetry is used in safety pharmacology, where it can provide detailed cardiac safety data by ECG monitoring.

Thanks to basic research in medicine and biotelemetry, OT Solutions have developed a prototype which surpasses currently existing solutions: higher accuracy of data, smaller sensors, longer battery life, possibility to use almost any sensors. Though the system is still under development different implanted multisensor sets for cardiologic, neurological and other biomedical purposes are currently being tested by authorized laboratories.

OT Solutions biotelemetry solution, simple and reliable, provides accurate, continuous measurement of physiological parameters of small freely moving laboratory animals such as mice, rats or guinea pigs. Subjects can be monitored with minimal stress, 24 hours a day continuously during several months. The absence of restraints during the collection of physiological data allows to study animals with minimal stress during a long period of time in their normal housing.

Lomonosov Moscow State University's School of Medicine, - OT Solutions' partner - can also offer comprehensive biotelemetry studies, including microsurgery, biotelemetric monitoring, data analysis and interpretation, based on OT Solutions biotelemetry system.

Solution Components

The system consists of a small telemetric module to be implanted into the animal, the transceiver(s) and the data processing server. The implanted telemetric module monitors one or more physiological parameters and transmits the collected data via radio channel to a nearby transceiver. It passes the data to a PC for processing, recording and analysis. The PC software system controls the experiment and manages the operational modes of the implantable devices.

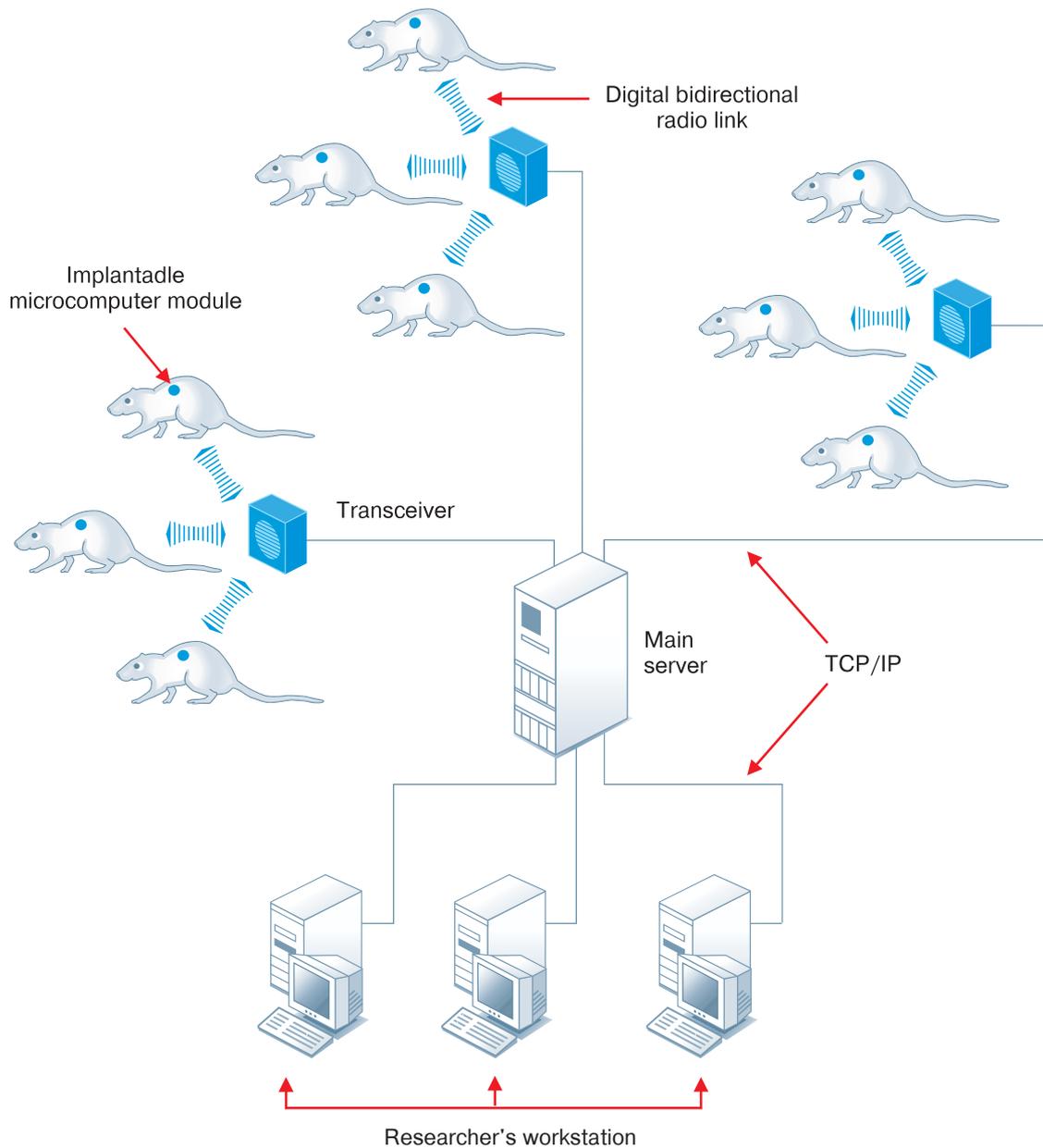


Figure 1: Components of the system

The implantable module consists of:

- ▶ A physiological parameter analog sensor
- ▶ An analog sensor interface
- ▶ A 16 bit microcomputer
- ▶ A radio interface
- ▶ A battery

Basic multisensor set provides the following measurements:

- ▶ Electrocardiography (ECG)
- ▶ Electroencephalography (EEG)
- ▶ Electromyography (EMG)
- ▶ Blood pressure
- ▶ Body temperature (t^0)
- ▶ Breath measurements

Features

Benefits

Implantability

- ▶ Direct measurement of physiological parameters
- ▶ The influence of implanted module on the animals is minimal, allowing to collect **high quality** data. The animals have minimal stress and live in their normal housing.
- ▶ The laboratory animal can live longer, allowing longer duration of the experiment

Digital data sampling and processing IN SITU

- ▶ Compatible with any sensor ("polyvalency")
- ▶ Suitable for simultaneous multiparametric measurements
- ▶ Suitable for stimulator (effector) management

Bidirectional radio interface

- ▶ The implanted module can be managed and reconfigured from a PC
- ▶ The researcher doesn't influence the natural behavior of the animals when managing the implanted module

Digital radio interface

- ▶ Possibility of monitoring a group of animals in one cage
- ▶ No data distortion during transmission
- ▶ The transmission errors are immediately detected and corrected

Client server software architecture

- ▶ The system supports complex experiments with several distributed groups of animals, located far from each other
- ▶ The researcher can remotely access the results of experiment, as well as remotely manage the research

Model-driven software architecture

- ▶ The user interface can be easily customized to adapt to specific client's requirements

OS independent software

- ▶ Compatible with most hardware platforms
- ▶ Minimize the risk of OS upgrade and patching

Technical Features

Size of implanted transceivers

25 x 20 x 10 mm

Battery life

2+ months

Types of physiological parameters

ECG, t^0 , Blood Pressure, EEG, EMG, Breath Measurements

Number of monitored animals per receiver

1 - 8

Sampling Frequency

Up to 5 KHz

Contact

OT Solutions SA
Pl. du Marché 1
CH-1260 Nyon
Switzerland

Web: www.otsolutions.ch
E-mail: info@otsolutions.ch
Phone: + 41 22 365 67 77
Fax: + 41 22 365 67 78