



# Remote monitoring of the physiological status by HRV

Course of action: BigData, AI, Neural Networks,  
Medtech, Digital Health, Life Science

Network Media  
Saint Petesburg, 2017

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**NETWORK  
MEDIA**  
ITSolutions



# Before



## Expectation

- Caring gadgets would improve users' lives
- Billions of dollars of investments would bring trillions of profit from globally collected data
- Businesses and private users would get the reliable and comprehensive information about health status and recommendations on improving it

## Reality

- Very low accuracy
- Impossible to undertake an analysis based on incorrect data
- The market start to fall, manufacturers are leaving the market, investors losing money
- A full monitoring system has never been created



The bracelets market is falling because it has felt short of expectations for the real health monitoring - collection of really accurate data has never been achieved. And analytics based on the wrong data couldn't show the real situation.



# Scientific partners of the project



St. Petersburg Institute of Multidisciplinary Sciences is the leading private specialized institute in the field of a biological feedback, rehabilitology and medical analytics.

Our measuring method is based on cardiointervalography (CIG) and recognised by World Health Organization. Use of this technique was declared in some existing solutions, but there is not full implementation at the moment. We will not reveal the details of the CIG method in this presentation in order to preserve our leadership on the market.

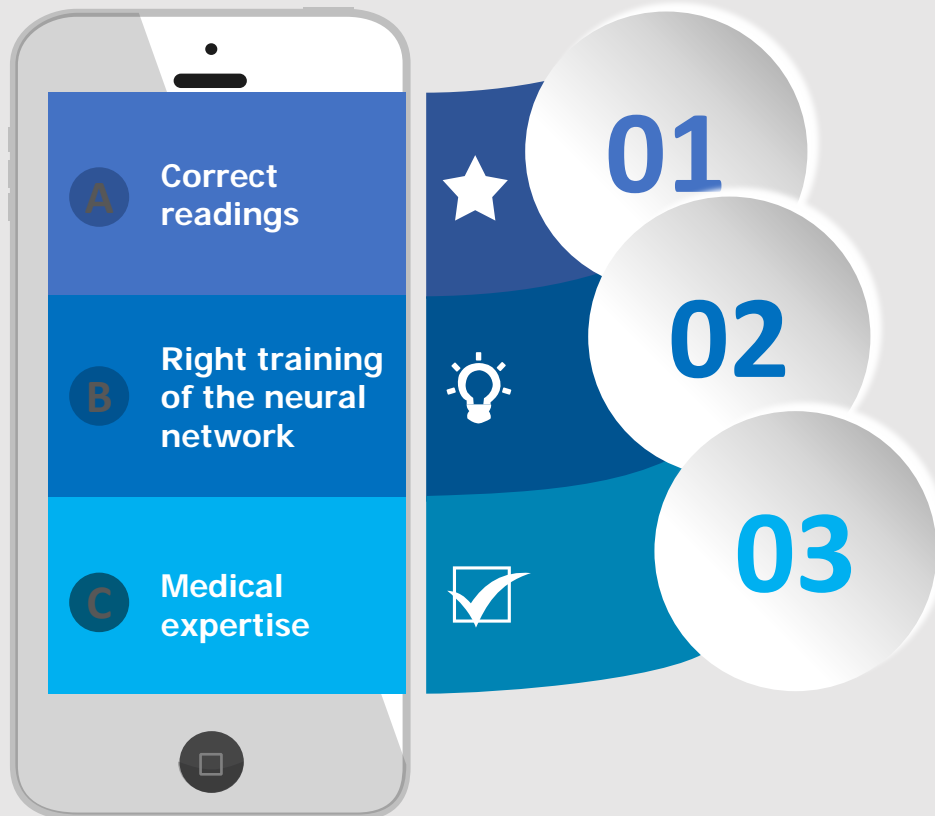


I.M.Sechenov First Moscow State Medical University is among the best medical universities of the world, it has leading positions in the Russian health care system and has it's own clinical and diagnostic base.



**World Health  
Organization**

# Success factors



## Accurate medical data

- Cardiography sensors are certified as medical equipment and record the real data
- Very high accuracy
- The technique is recognized by medical community

## Smart analyzer

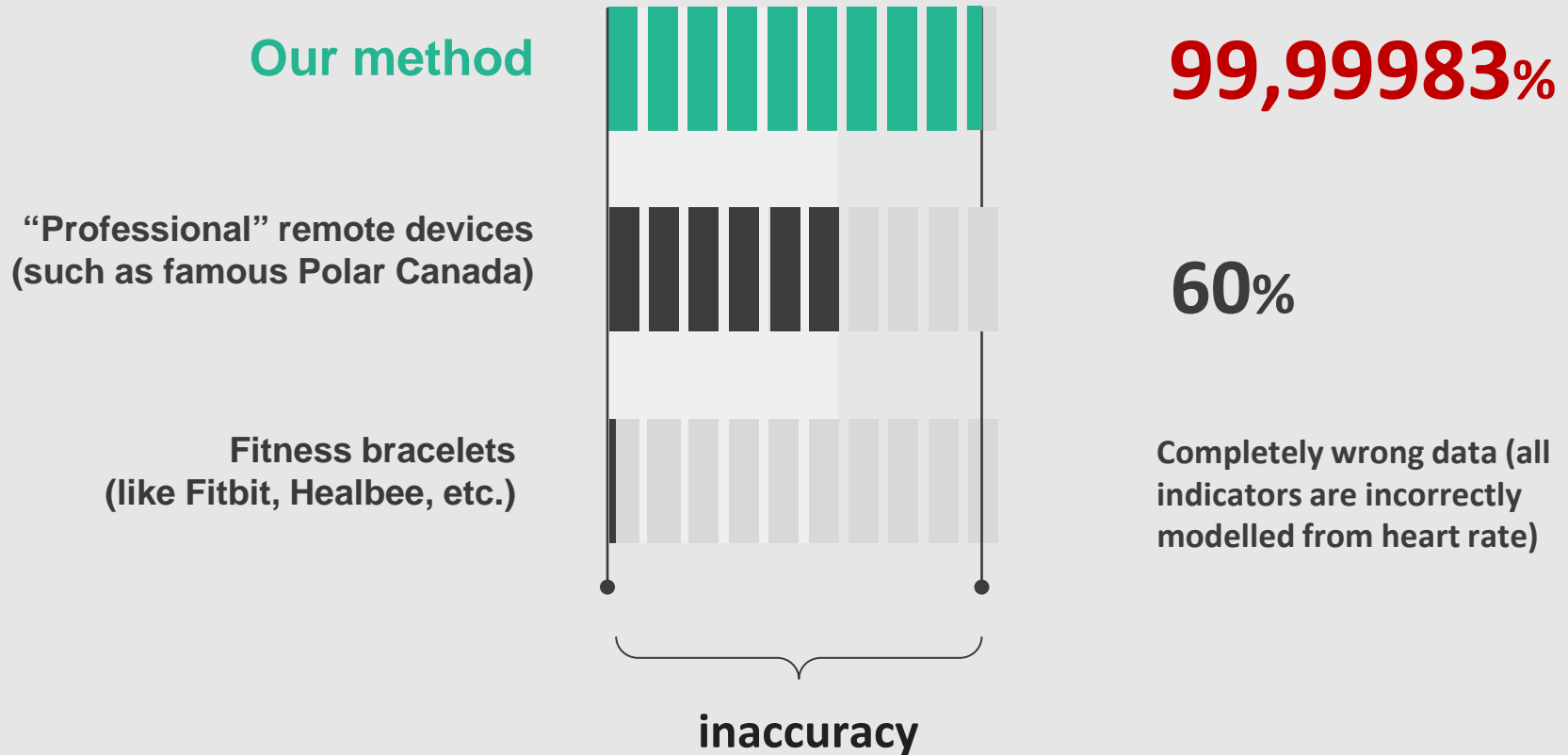
The neural network learning on the data array of the real cardiography data would predict user's health state basing on the personal history

## Real medical expertise

We already have a medical examination and some potential customers, like professional sportsmen and staff working under high-stress

# Accuracy of collected data

The accuracy of Heart Rate Variability data is **fundamentally** different.



In general terms, we measure the speed to within millimeters per second, when Photoplethysmography (used in fitness bracelets and different sensors) could only make it to the nearest kilometers per hour.

IT IS ONLY CARDIO  
NOT THE **WHOLE SYSTEM**

# Monitoring complex

## Working system solution

Analysis and access :

- Neural network for analyzing and prediction;



- ✓ Self-education
- ✓ Advisory service
- ✓ Visualization

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Data collection and transmission:

- Smart watch with data transmission
- Smartphones
- Stationary systems



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Acquisition data from sensors:

- Cardio
- Pressure
- Glucose meter
- Puls oximeter
- Any other caring sensors

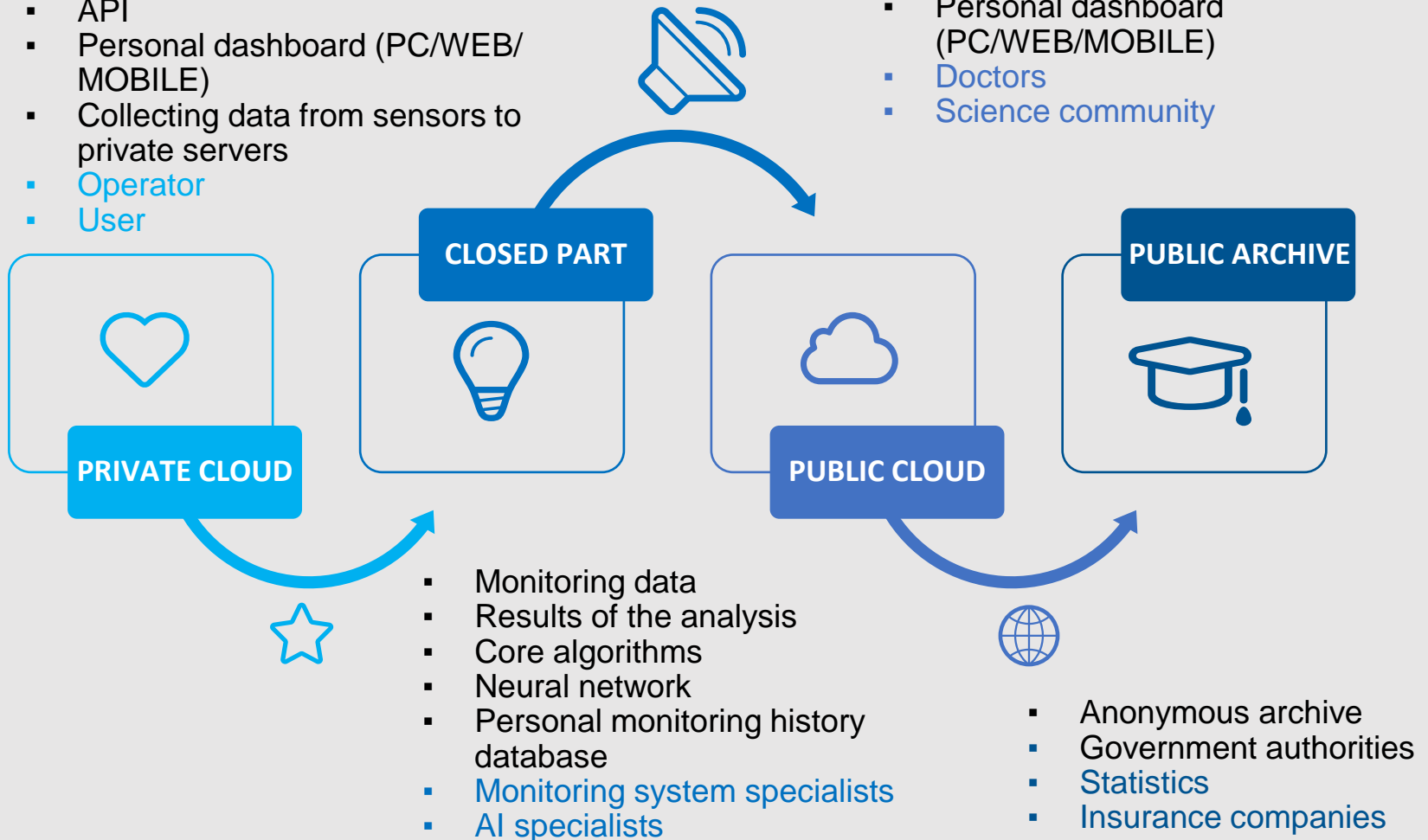




# AI Health service scheme

- Operational server  
doctor/dispatcher/patient
- API
- Personal dashboard (PC/WEB/  
MOBILE)
- Collecting data from sensors to  
private servers
- Operator
- User

- Depersonalized history
- Personal dashboard  
(PC/WEB/MOBILE)
- Doctors
- Science community



# AI-Health

*«Prevention is always better than cure»*



Remote monitoring and diagnostics for early prevention of the disease and protection of health



The amount of accumulated and analyzed data, self-education and decision making by the system

- An intellectual system of recommendations on the health state correction
- Automated systems for warning and notifications

- In five years, practicing on millions of patients, the system will learn to diagnose and predict health status better than specialists
- Significant reduction of inaccuracy due to the new measuring algorithm



Keeping history in the anonymous BigData;

- Access to data for doctor/dispatcher/user
- Personal «health history»

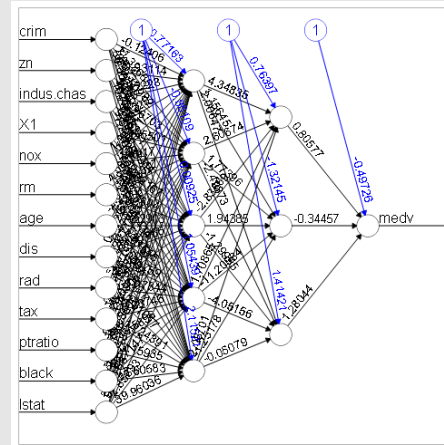
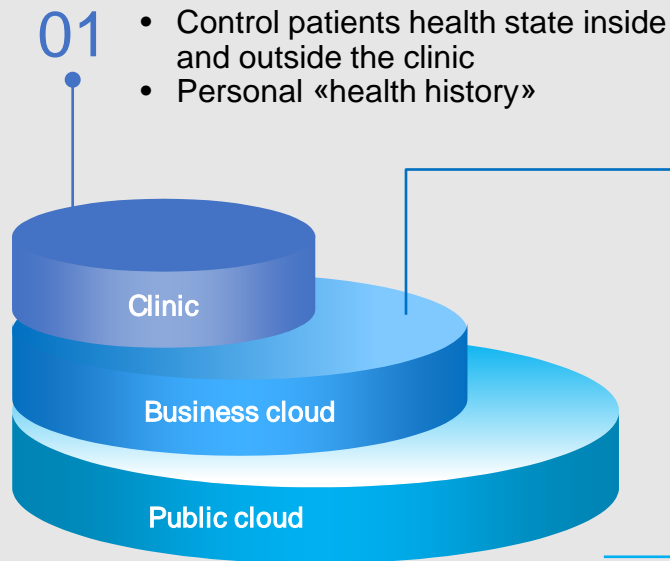


Reducing the possibility of a medical error

- Reducing the infrastructure losses through optimization and increasing the effectiveness of working process
- Reducing the costs of medical care through early informing and coordination



# Capacity of the data processing



## 02 Personal business cloud

Collection data analysis of the company's employees and dynamics tracking

## 03 Public depersonalized cloud

Data analysis and teaching doctors and neural network system

## Data processing

- ✓ Data from different sensors
- ✓ Reliable medical data
- ✓ Neural network learning on the data array of all users data
- ✓ Analysis and providing information and recommendation in real time
- ✓ Automated control
- ✓ Self-education and decision making by the system
- ✓ Prediction and warning
- ✓ Integration of any sources of information to the database

# Additional advantages

In case of competing technology appears – we will create ready to use commercial product quicker and cheaper. There are two reasons for this: real sectoral medical database and professional russian software developers (considered as one of the best for solving complex IT problems).

## QUICK DEVELOPMENT

## SELLING DATA TO INSURANCE COMPANIES

Insurance companies are ready to buy arrays of the real Big Data. It's better to pay for monitoring and prevention of diseases then for curing it



Market size allows to dictate the terms and prices and to develop the project in any direction and use case

## OPEN MARKET

## REAL LEARNING

Neural network learning on array of data from real sensors allows to predict user's state based on personal history



# NOT ONLY FOR MEDICINE

The system is applicable not only for healthcare sector, but in a real business.

For example, we can take stress indicators for workers of hazardous industries or air-traffic controllers in real time. And in case of problem detection, management would be warned in advance if an employee needs a replacement of a vacation/resignation. Completely different brand new markets has being opened before us.



# B2B and B2G market (now - in 5 years)

## Medicine

Observation of patients, rehabilitation, changes of dynamic therapy corrections

\$110–330 bn



## Sport

Professional training

\$2–8 bn



## Logistics and transport

Car and train drivers, engineers, dispatchers, air controllers

\$40–200 bn



## Industry

Personnel for complicated and dangerous industries

\$30–120 bn



## Energy

Operators and dispatchers

\$2–13 bn



## New markets

To too big nowadays, but promising to grow in the future: astronautics, control of remote devices, monitoring players in virtual reality, and so on.



## Public service

Firefighter, rescue teams, intelligence services, army

\$70-230 bn



## Related markets

Markets with decreasing costs, such as insurance market. Statistics for insurance companies, medical and government facilities

\$30-110 bn

**IN 5 YEARS – potential total market \$1 trillion**

# EXAMPLES OF INTEGRATION

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## USE CASE

# Use case - Airport



Monitoring sensor on every dispatcher

Private cloud:

- Data analysis
- Warnings
- Recommendations on work and rest regime

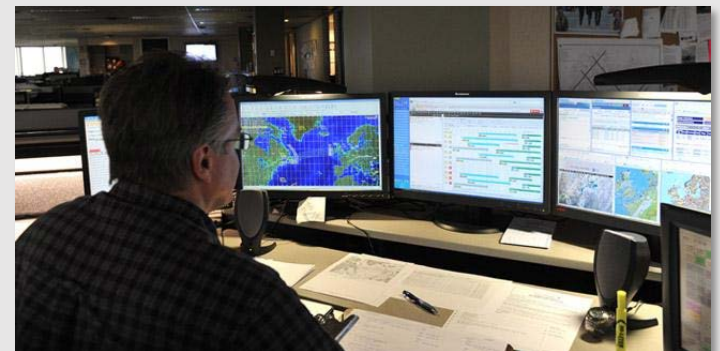


Supervisor:

- Controls staff state
- Optimization of the dispatchers work

## Result:

- Improving the performance of staff
- Improving the effectiveness of work through optimal work schedule
- Decreasing level of morbidity, absenteeism and loss of working capacity
- Enhancing the safety of flights



# Use case – Sport



Monitoring sensors on every sportsman

Private cloud:

- Athlete's state analysis
- Personal recommendations on training and rest regime



Command trainer/doctor:

- Controls sportsmen state
- Optimization of the training process



## Result:

- Improving the quality of training
- Improving the results
- Decreasing morbidity and traumatism
- Protecting health and working capacity



# Use case – Insurance company

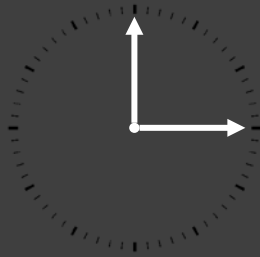


## Result:

- Morbidity statistics
- Accurate estimation of risks
- Calculating insurance costs disaggregated by groups of users
- Timely health care
- Keeping users healthy
- Decreasing costs of insured services







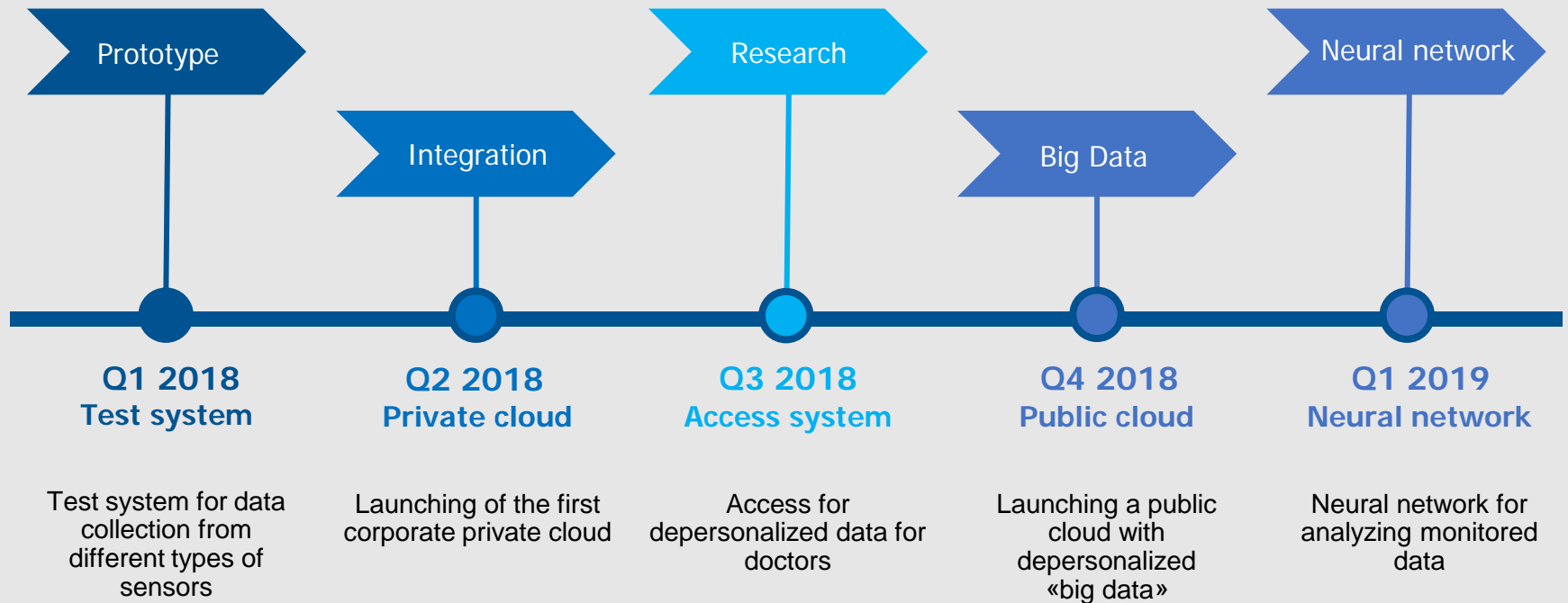
# TIME FOR RELAX

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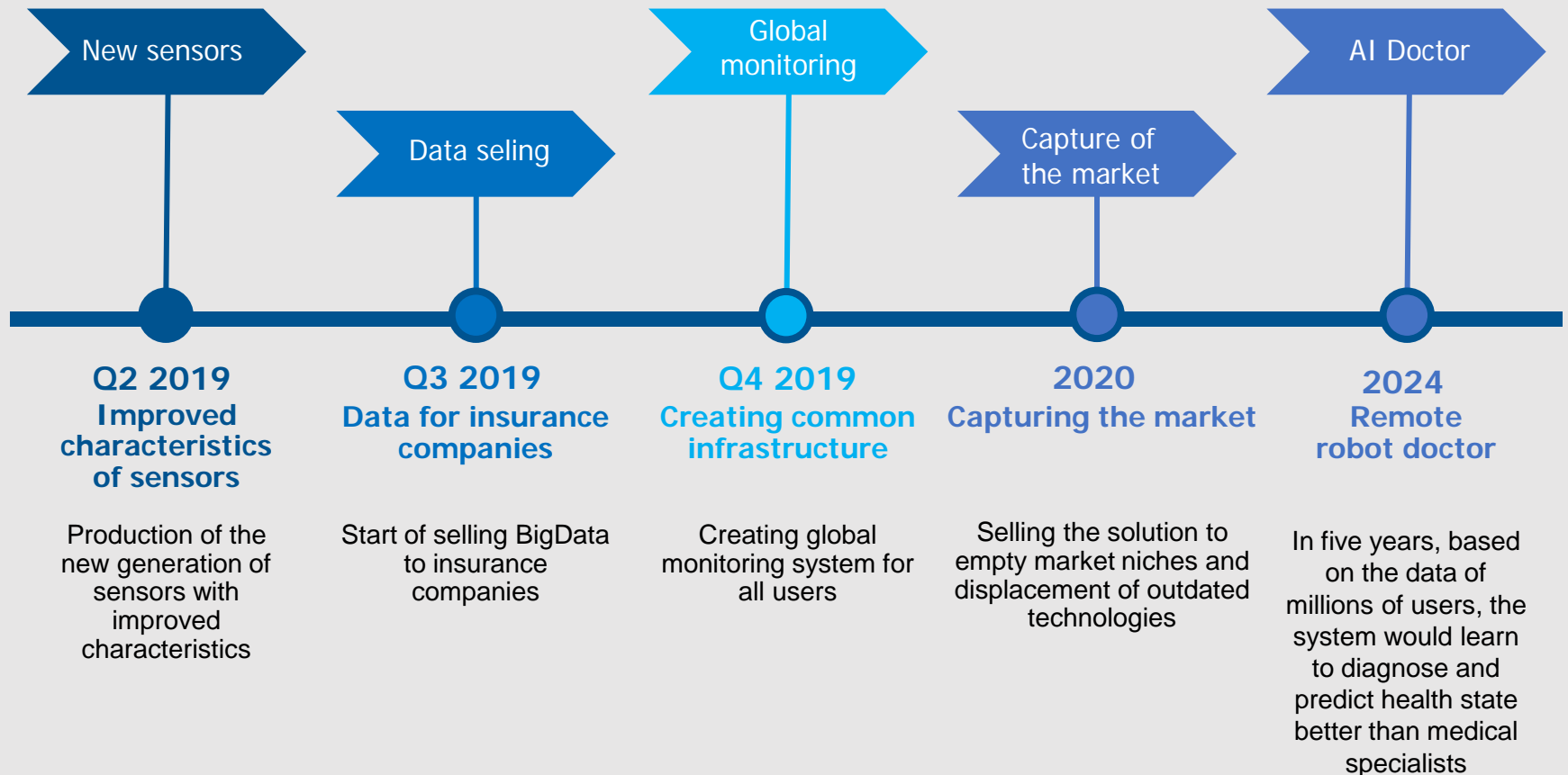
Process the information = )



# Road map



# Road map



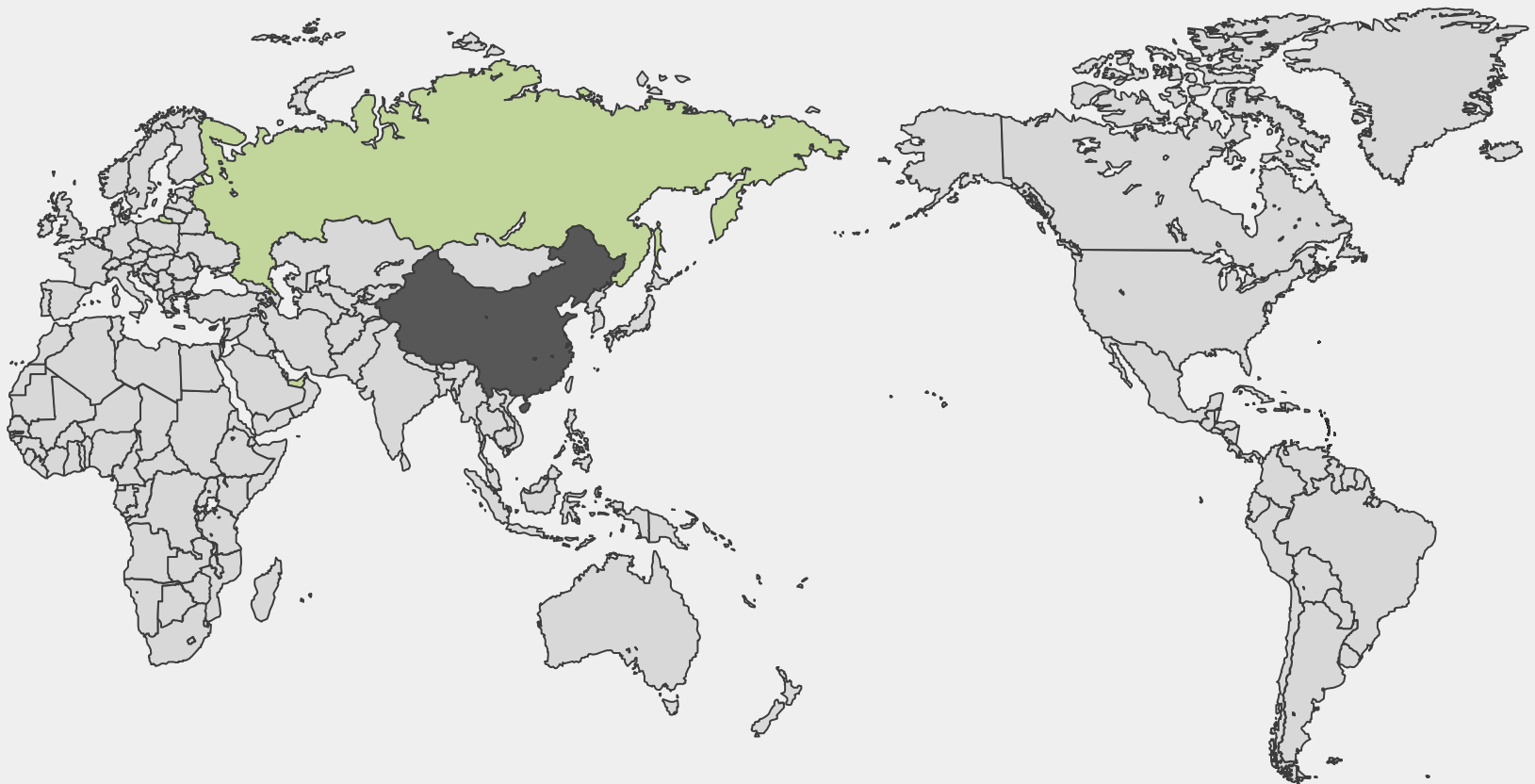
# Map of coverage

## Current situation

2018

■ Launching the solution on the stage 1 markets

■ Sensors production

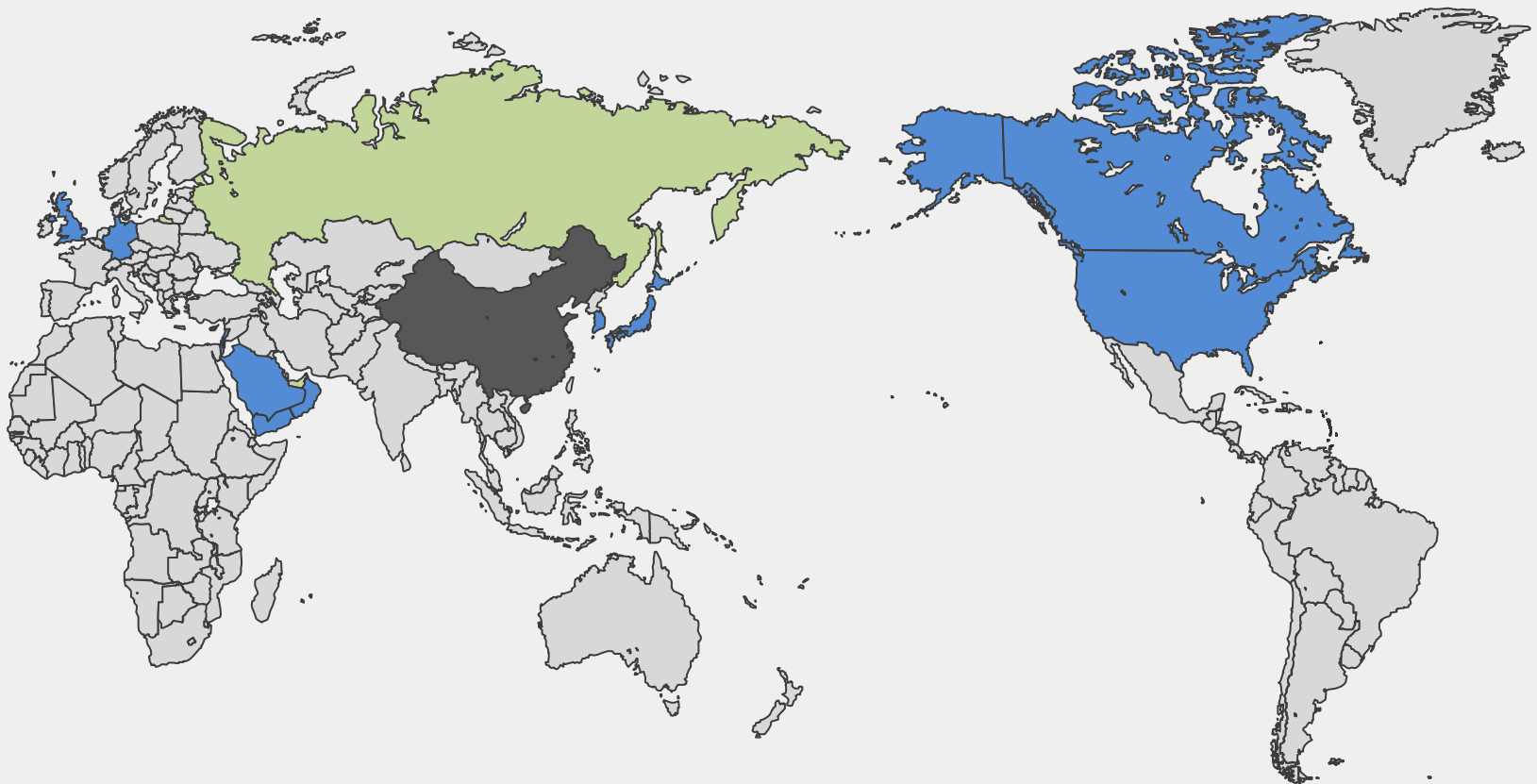


# Map of coverage

## Commercial version

2019

■ Launching the solution on stage 2 markets  
■ Sensors production markets

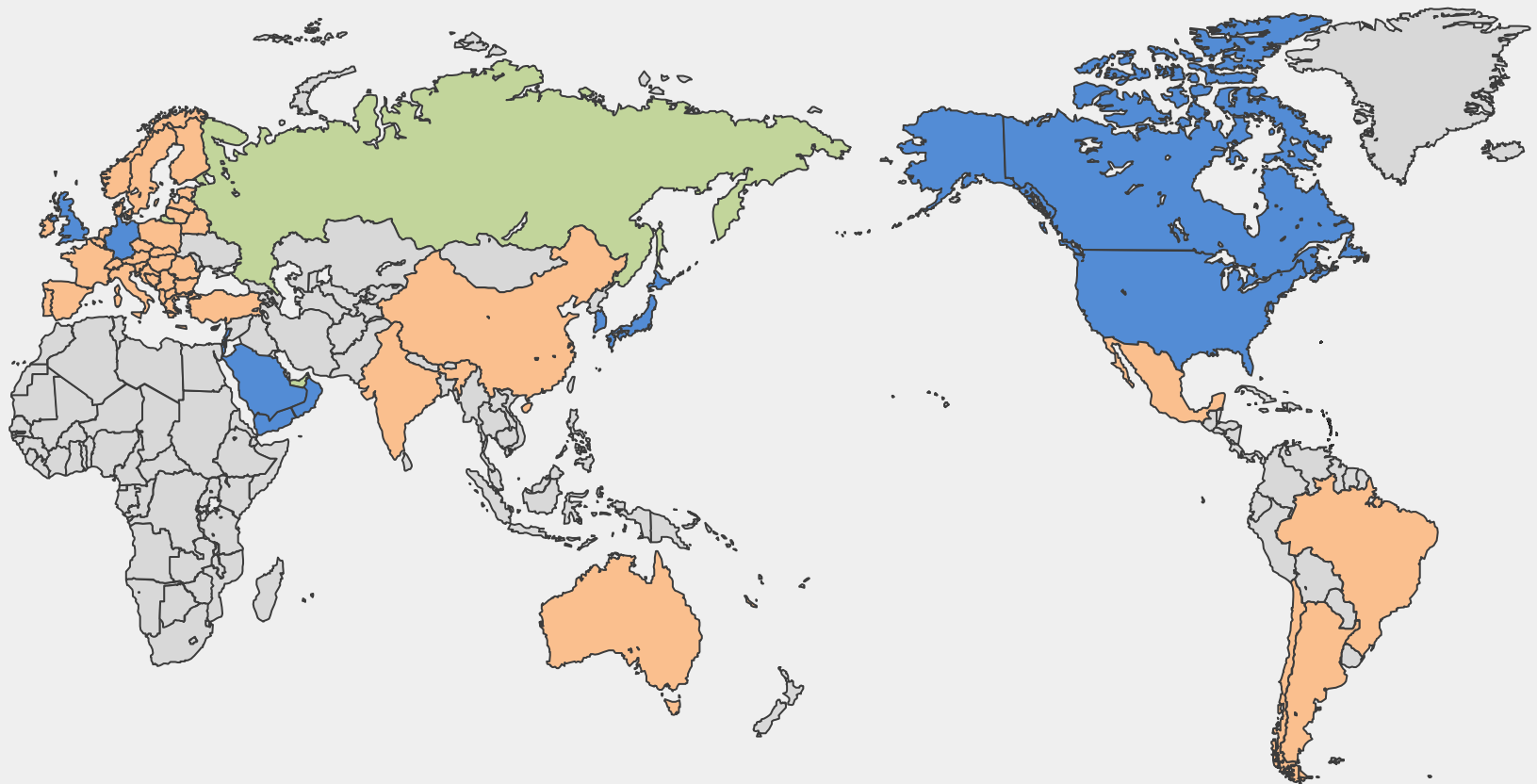




# Commercial version

2020

### Launching the solution on stage 3 markets



# Project management



CEO

Rustam Abdyukhanov

Experience in business 10+ years  
Experience in IT development 8+ years  
More than 100 realized projects in  
outsourcing development



CMO

Sergey Gromov

Biofeedback system engineer,  
sales manager of monitoring  
systems and biofeedback trainings



CSO

Stanislav Kotlyarov

Cardiologist, SPb IMS  
Leading specialist on  
rehabilitation after miocardical  
infarction



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