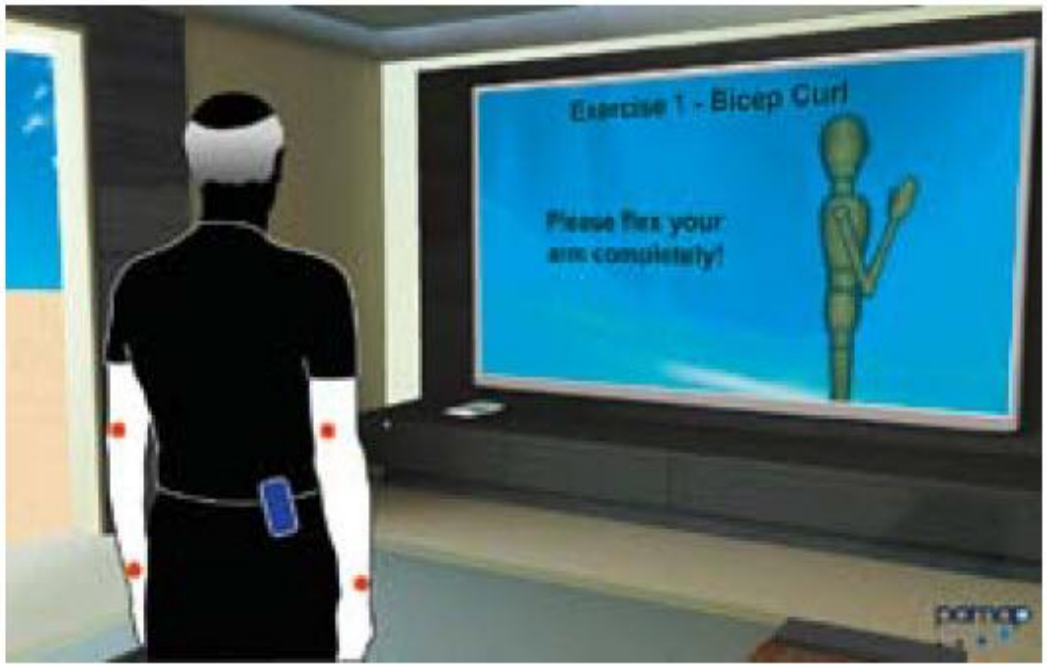
Types of Sensors

- Contact sensors (accelerometers, ECG, EMG, EEG, Pulse oximeters, glucose level, etc.
- Non Contact Sensors (video analysis of movement (Kinect), heart rate and breath rate (VitalSign), IR , Bio-radars, audio
- Two Types of Implantable sensors –
  - With battery
  - Without battery (RFID (NFC),

Activity monitoring in elderly people



PARTNERS

DFKI	R&D, Coordinator	Germany	http://www.dfki.de
INTRACOM TELECOM	Business, R&D	Greece	http://www.intracom-telecom.com/
University of Compiegne	R&D	France	http://www.utc.fr/
TRIVISIO Prototyping GmbH	SME	Germany	http://www.trivisio.com/
Centre Hospitalier Universitaire de Rennes	End user	France	http://www.chu-rennes.fr/

Name of the project :
PAMAP / Physical Activity Monitoring for Aging People

Coordinator: Prof. Dr. Didier Stricker

Duration: 36 months

Starting date: 01 July 2009

Total budget: 2.771.929 €

Public contribution: 1.987.369 €

Contact: Prof. Dr. Didier Stricker
Phone: (+49) 631-20575-3500/3510
Email: Didier.Stricker@dfki.de
Technical Coordinator:
Dr. Gabriele Bleser
Phone: (+49) 631-20575-3560
Email: Gabriele.Bleser@dfki.de

Website: http://www.pamap.org

IS-ACTIVE

Inertial Sensing Systems for Advanced Chronic Condition Monitoring and Risk Prevention

The project emphasizes the role of the home as care environment, by providing real-time support to patients. IS-ACTIVE proposes a combined technological solution, which uses intelligent miniaturized inertial sensing used for ambulatory human movement analysis, and wireless communication.

The IS-ACTIVE sensor-based system is meant to provide the patients:

- An effective sensing system for daily use, which analyzes in real-time their physical activity and condition;
- An easy-to-use interface and a natural feedback, so that they become easily aware about the importance of self-management.

Field trials will be conducted in different locations and their results are expected to provide qualitative and quantitative indications on the system accuracy, robustness, reliability and usability, together with assessing the user experience regarding the motivation in self-managing the chronic condition.

Screenshots of the smart phone feedback device:

PARTNERS

University of Twente	R&D	The Netherlands	www.utwente.nl
Roessingh Research & Development	R&D, SME, End-users	The Netherlands	www.rrd.nl
Inertia Technology	R&D, SME	The Netherlands	www.inertia-technology.com
Norwegian Centre for Integrated Care and Telemedicine	R&D, End-user	Norway	www.telemed.no
NORUT Northern Research Institute	R&D	Norway	www.norut.no
University Hospital Elias	R&D, End-user	Romania	www.spitalul-elias.ro
PROSYS PC	R&D, SME	Romania	

Name of the project :
IS-ACTIVE / Inertial Sensing Systems for Advanced Chronic Condition Monitoring and Risk Prevention

Coordinator: Prof. Dr. Paul Havinga, University of Twente

Duration: 36 months

Starting date: 1 April2009

Total budget: 1,814,812 €

Public contribution: 1,394,777 €

Contact: Dr. Raluca Marin-Perianu
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+31 53 489 3633
Pervasive Systems Group, Department of Computer Science
Zilverling Building
PO-Box 217
7500 AE Enschede
The Netherlands

Website: www.is-active.eu

IS-ACTIVE

Hermie Hermens

11. Do you think this AAL solution is easy to use / userfriendly?

1) Very simple

2) I would need some training

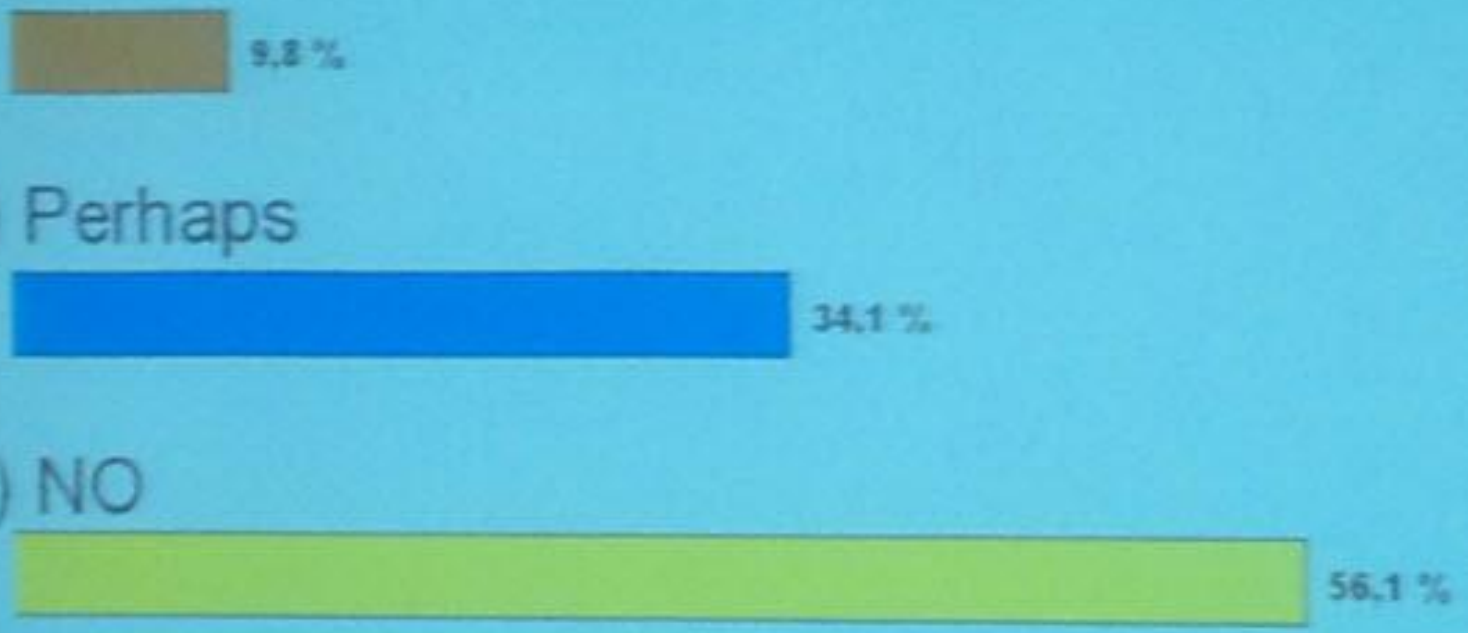
3) Too complicated

IS-ACTIVE

Hermie Hermens

AAL FORUM 2012

12. Would you buy/rent/subscribe to this AAL solution when it is on the market (for a reasonable price)?



Heart rate monitors

Blatand

*Join your Body - **Blatand Body Networking.***

Home | Company | Products & Services | Customers | Contact

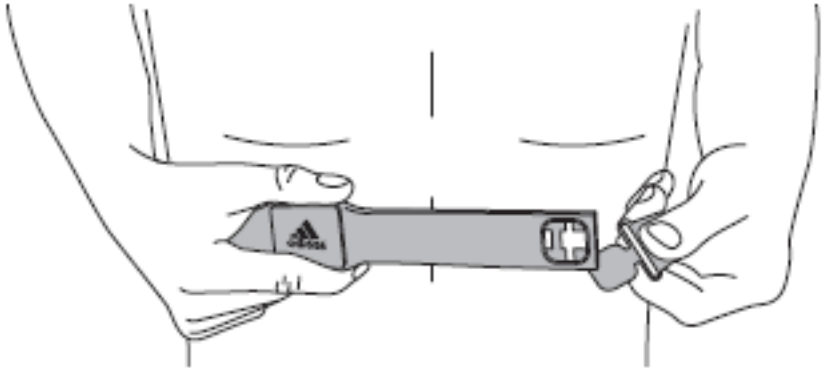
Bluetooth Heart Rate Monitor.

"People who are really serious about software should make their own hardware." - Steve Jobs quotes Alan Kay at the MacWorld 2007.

Blatand offers a worldwide unique chest strap for heart rate monitoring. The chest strap communicates via Bluetooth short distance radio with your mobile phone or other end devices, e. g., the Bluetooth access point at a gym, a home computer or the rehab staff's PDA.

It is convenient, persistent, interference-proof, tap-proof and less expensive than conventional products.

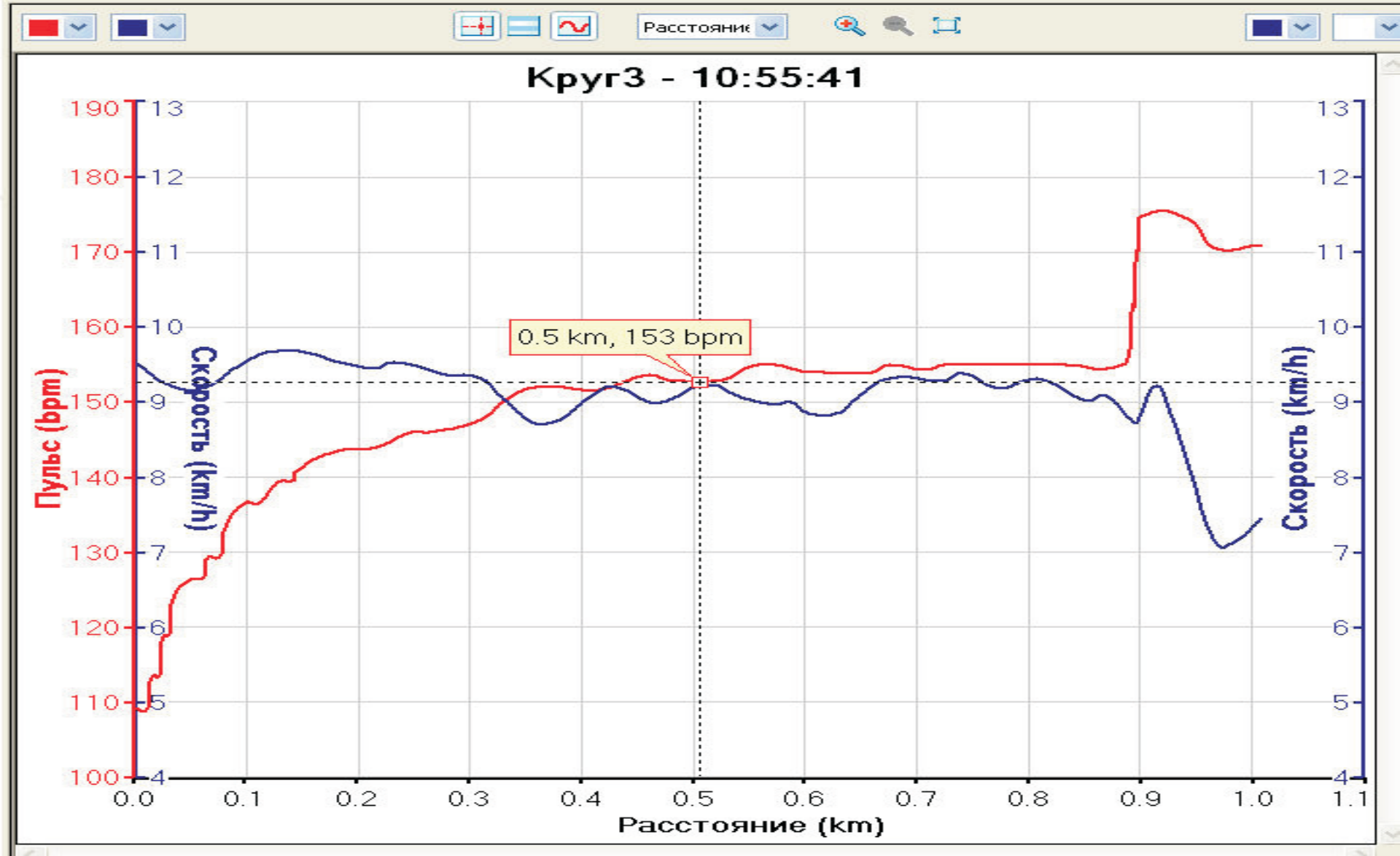
(см. Рис. 1)



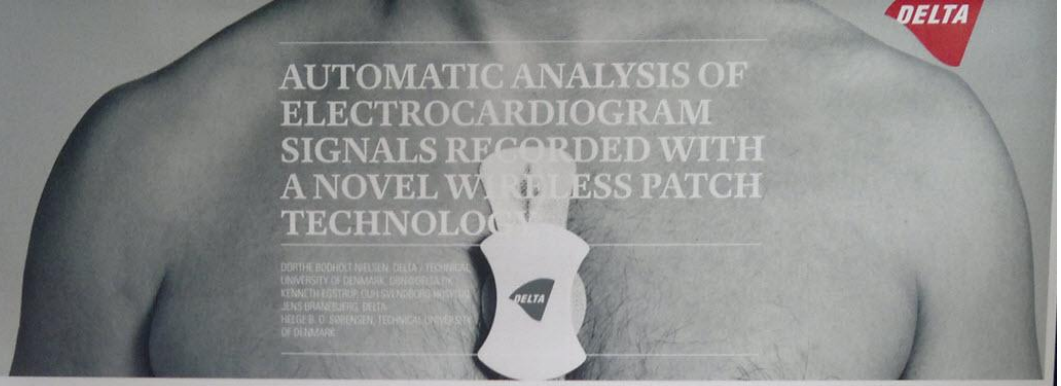
(см. Рис. 2)

ECG monitor developed at the University of Kuopio, Finland

Garmin with GPS reciever and heart rate monitor


Расстояние
Круг3 - 10:55:41
0.5 km, 153 bpm
Пульс (bpm)
Скорость (km/h)
Скорость (km/h)
Расстояние (km)
190
180
170
160
150
140
130
120
110
100
13
12
11
10
9
8
7
6
5
4
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1.1

NuMetrex Heart Rate Monitor Clothing
http://www.numetrex.com/



AUTOMATIC ANALYSIS OF ELECTROCARDIOGRAM SIGNALS RECORDED WITH A NOVEL WIRELESS PATCH TECHNOLOGY

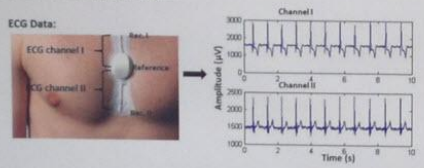
DORTHE BODHOT NIELSEN, DELTA / TECHNICAL UNIVERSITY OF DENMARK, DENMARK
KENNETH KOSTROP OLH SVENDSBORG HOSPITAL
JENS BRANDSLEVIG, DELTA
HELGE B. D. SØRENSEN, TECHNICAL UNIVERSITY OF DENMARK

Introduction

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia and a high number of aged citizens suffer from this disease (prevalence of 5-15% at the age of 80 years). AF gives a highly increased risk of other clinical events, especially stroke. However, this increased risk can be lowered with prober antithrombotic therapy. It is therefore crucial to diagnose these patients timely and initiate treatment. The diagnosis can, however, be impeded if the disease is silent or only happens in temporary episodes. It is therefore desirable to be able to perform long term recordings and screening for AF, especially in the elderly population. To do this, it is important to develop a small, wireless electrocardiogram (ECG) recording device that can automatically analyze the ECG signal and detect episodes of AF. DELTA has designed such a recording device, and the next step is to design automatic mathematical methods (algorithms) to detect the AF events. The first step in this, is to create an algorithm that can automatically find each heart beat (QRS complex), and the design of such an algorithm is the focus in this study.

The DELTA ePatch Technology

The ePatch electrode is able to record 2 ECG leads:



Some of the advantages of the ePatch are:

- Wear and forget design
- Easy to use
- High user comfort
- Wireless, only one patch is needed to record the ECG signal
- Potential for very long term recordings

Data

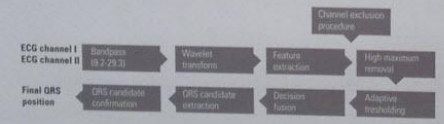
The algorithm was designed and optimized for ECG signals recorded with the ePatch electrode:

- 30 minute ECG records from 11 different patients
- The database was manullay scored by a cardiologist to create reference labels
- Database consitns a total of more than 22,000 beats including 420 supraventricular ectopic beats (SVEBs) and 361 ventricular ectopic beats (VEBs)

Automatic QRS Complex Detection

The designed algorithm can automatically detect each heart beat from the ECG signal and it consists of several steps.

The algorithm uses information from both ECG leads:



An illustration of some of the steps in the algorithm is provided below:

Results

The detection sensitivity and positive predictivity on the ePatch database is provided below:

PATIENT ID	NUMBER OF BEATS	SENSITIVITY	POSITIVE PREDICTIVITY
1	1450	99.93 %	99.52 %
2	1617	100 %	100 %
3	1594	99.87 %	100 %
4	1727	100 %	100 %
5	1465	99.86 %	99.80 %
6	3049	100 %	100 %
7	1762	100 %	100 %
8	1984	99.95 %	100 %
9	2562	99.88 %	96.75 %
10	1651	99.94 %	99.94 %
11	3219	95.84 %	99.26 %
Mean	22080	99.57 %	99.57 %

The algorithm furthermors achieved to correctly detect all SVEBs and VEBs.
Two records contained considerable amounts of artefacts in long periods of the recording. If these are excluded from the evaluation, the average sensitivity and positive predtivity is 99.95% and 99.92%, respectively.

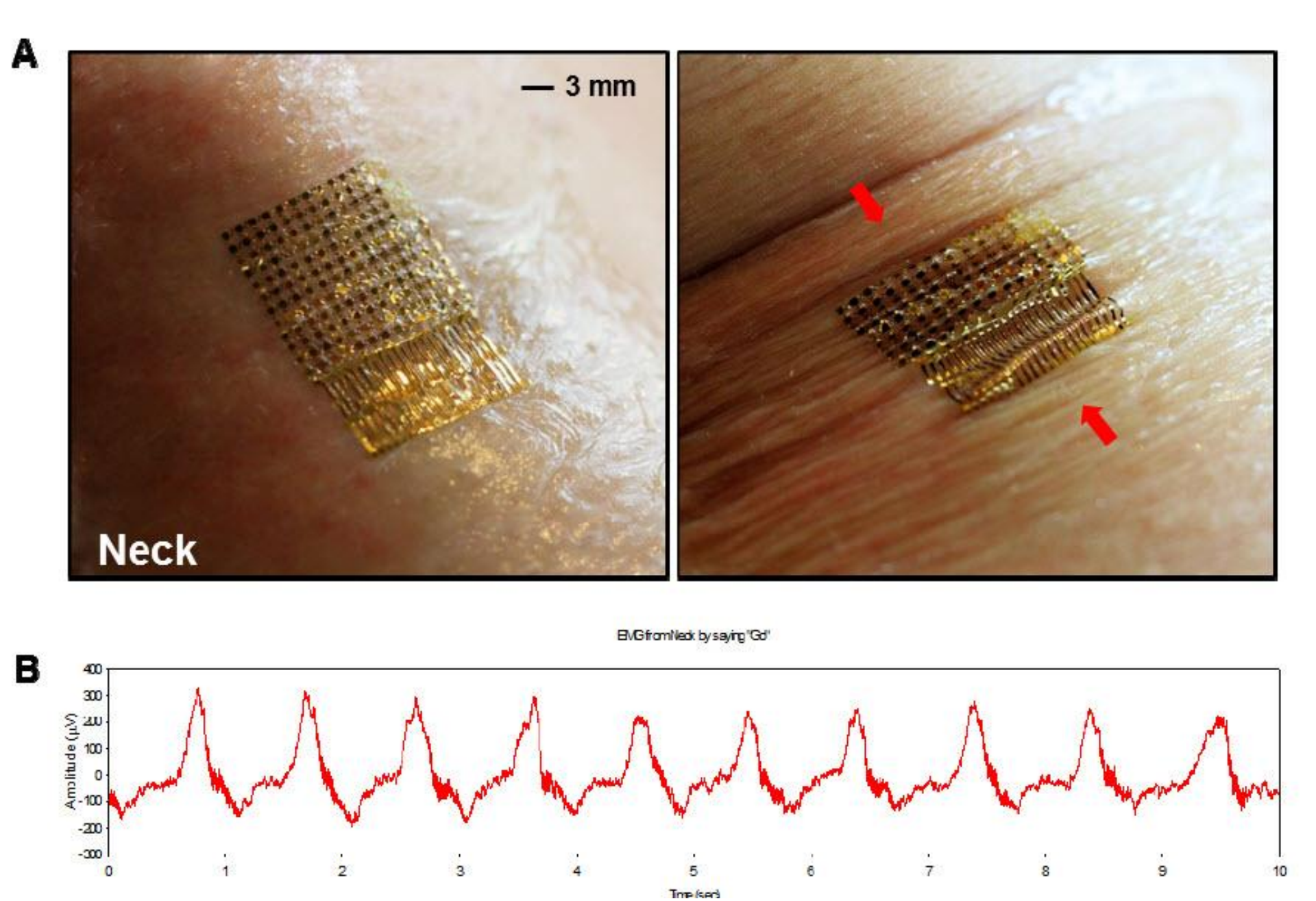
Conclusion

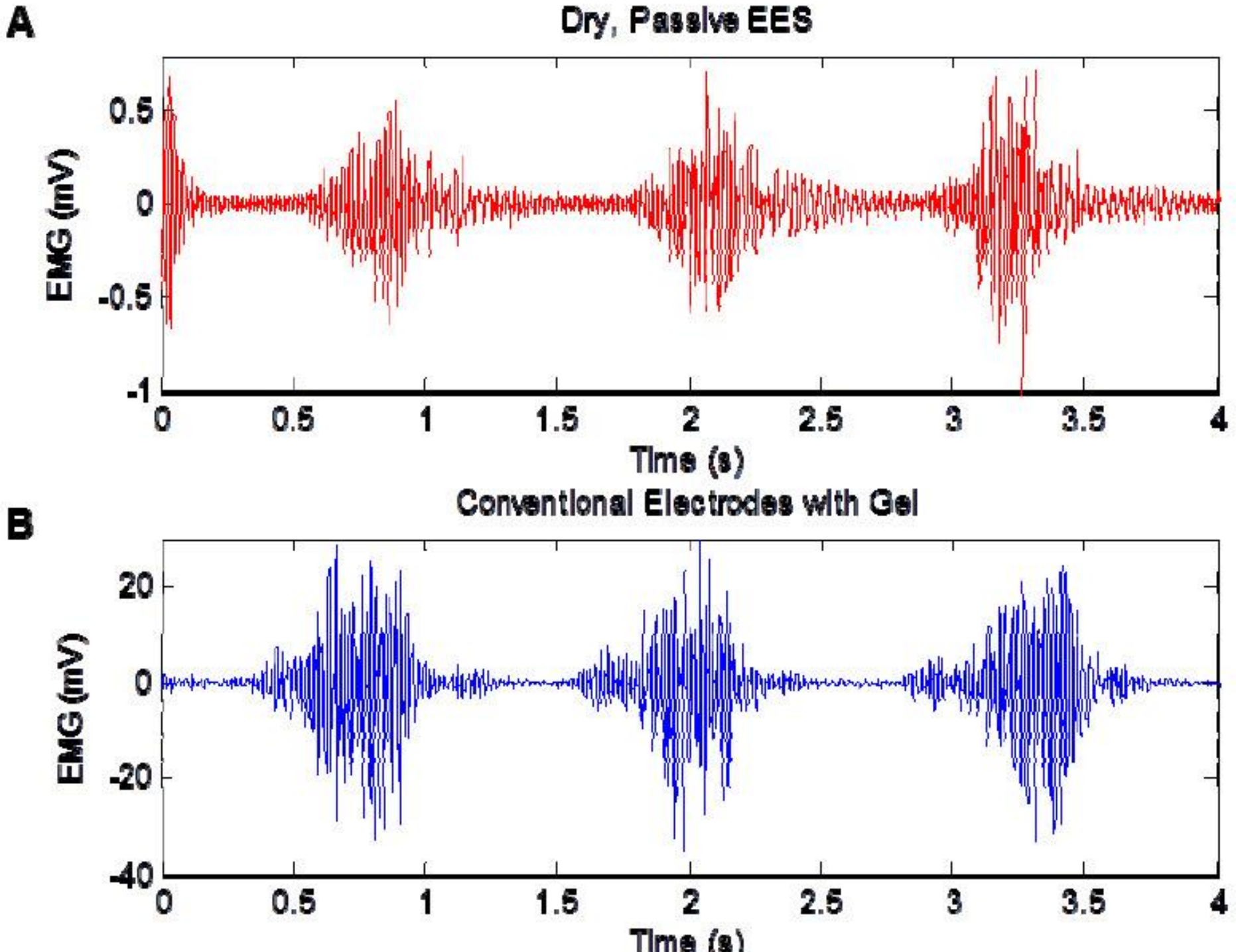
The DELTA ePatch was able to record ECG signals with a sufficient quality for automatic QRS complex detection. The designed algorithm obtained promising performance, especially with respect to abnormal heart beats. It is expected that the algorithm can be used as a first step in automatic detection of AF, and hereby improve diagnosis and treatment of AF. Early diagnosis might decrease the stroke risk, and hereby help elder citizens to safely continue their normal daily lifes at home.

Region of Southern Denmark

Technical University of Denmark DTU


SN
CAP 0072


A
— 3 mm
Neck
B
EMG from Neck by saying "Go"
Amplitude (μV)
400
300
200
100
0
-100
-200
-300
0
1
2
3
4
5
6
7
8
9
10


A
Dry, Passive EES
EMG (mV)
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Time (s)
B
Conventional Electrodes with Gel
EMG (mV)
20
0
-20
-40
0
0.5
1
1.5
2
2.5
3
3.5
4
Time (s)

Alive Technologies

Mobile Cardiac Monitoring

Bluetooth® ECG and Activity Monitor

Applications

- Cardiac Rehab
- Cardiovascular Screening
- Home Monitoring
- Disease Management
- Atrial Fibrillation Screening
- Mobile Telemedicine
- Activity Monitoring
- Falls Monitoring
- Fitness Monitoring
- Sports Training

AliveCor iPhone ECG

Nonin Onyx 2 9560 Bluetooth Wireless Finger Pulse Oximeter with FREE case!!

WORKS WITH Microsoft® HealthVault™

NONIN

NONIN PureSAT™ | SpO2

9560 Onyx II

The first wireless fingertip pulse oximeter

Oximetry Unplugged – Revolutionizing Disease Management With the increased need for remote disease management, there is an opportunity to provide oximetry monitoring solutions to simplify the exchange of secure information.

Glucometer with BlueTooth (Germany)

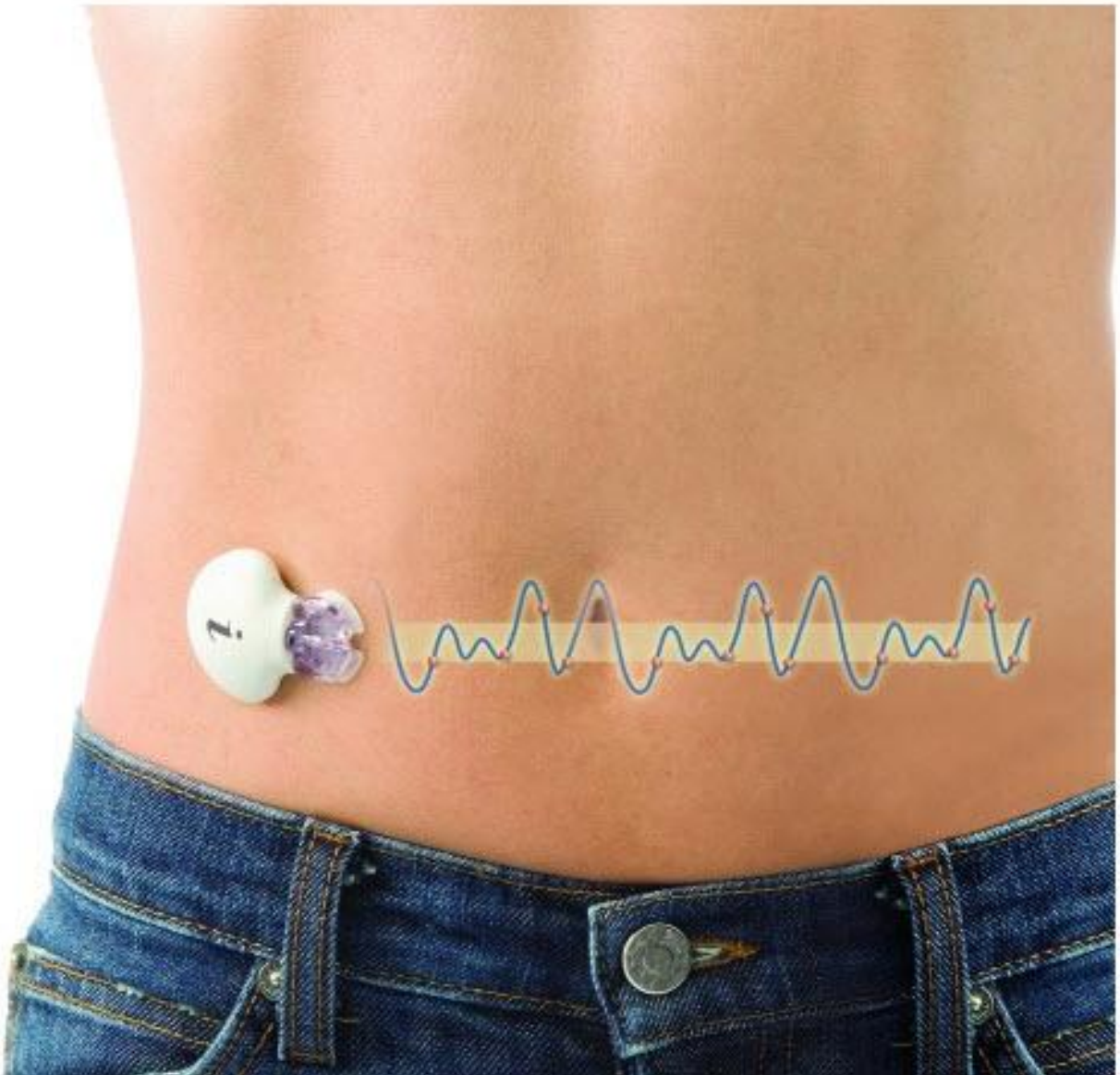
Tuesday, August 14, 2007

Reach Out And Prick Someone

Amy at DiabetesMine brings us the story on the GlucoPhone -- once considered vaporware, it's been quietly introduced by **HealthPia**:

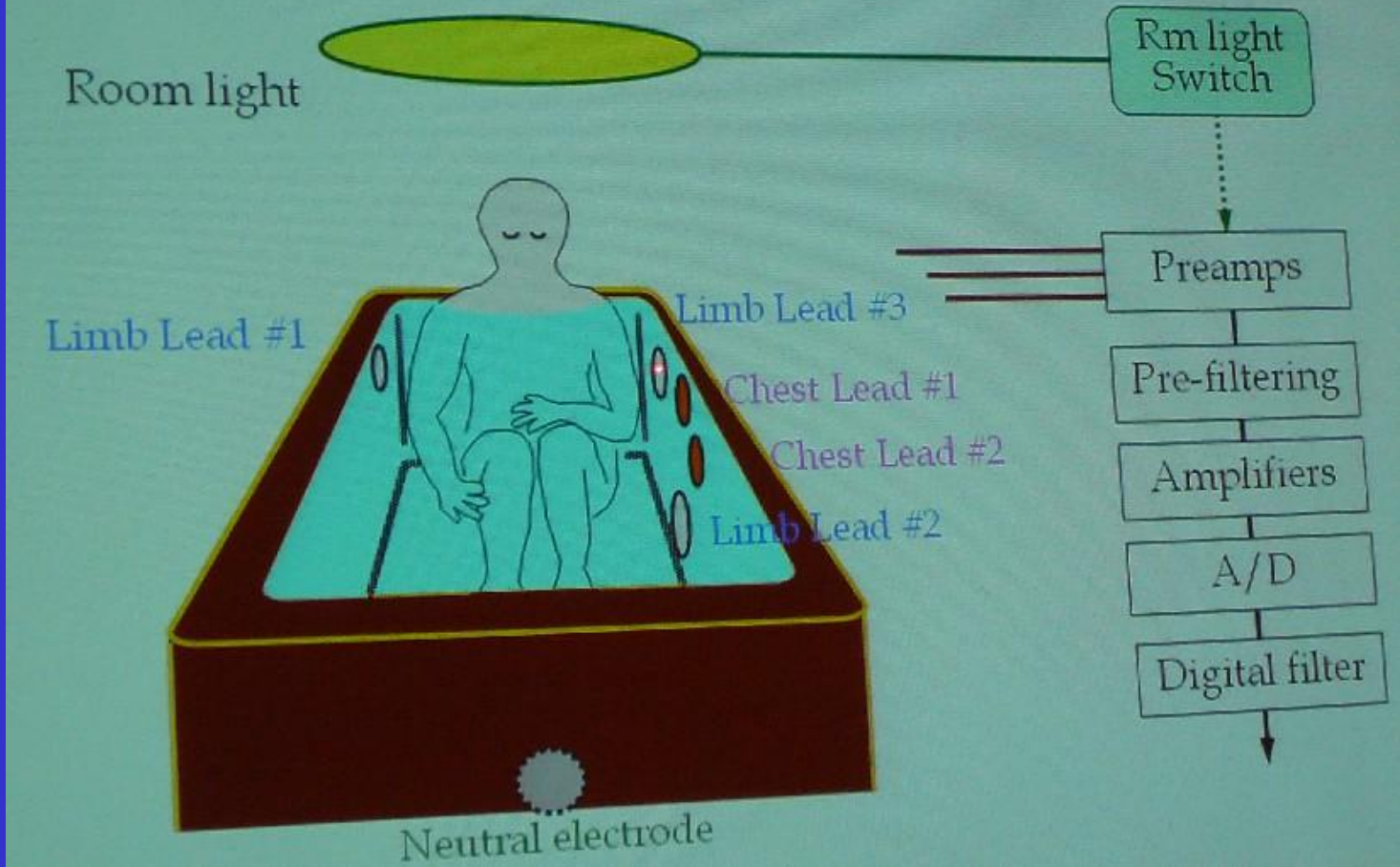
Medtronic Unveils iPro 2 Professional CGM

by GENE OSTROVSKY on Jun 9, 2010 • 12:00 am

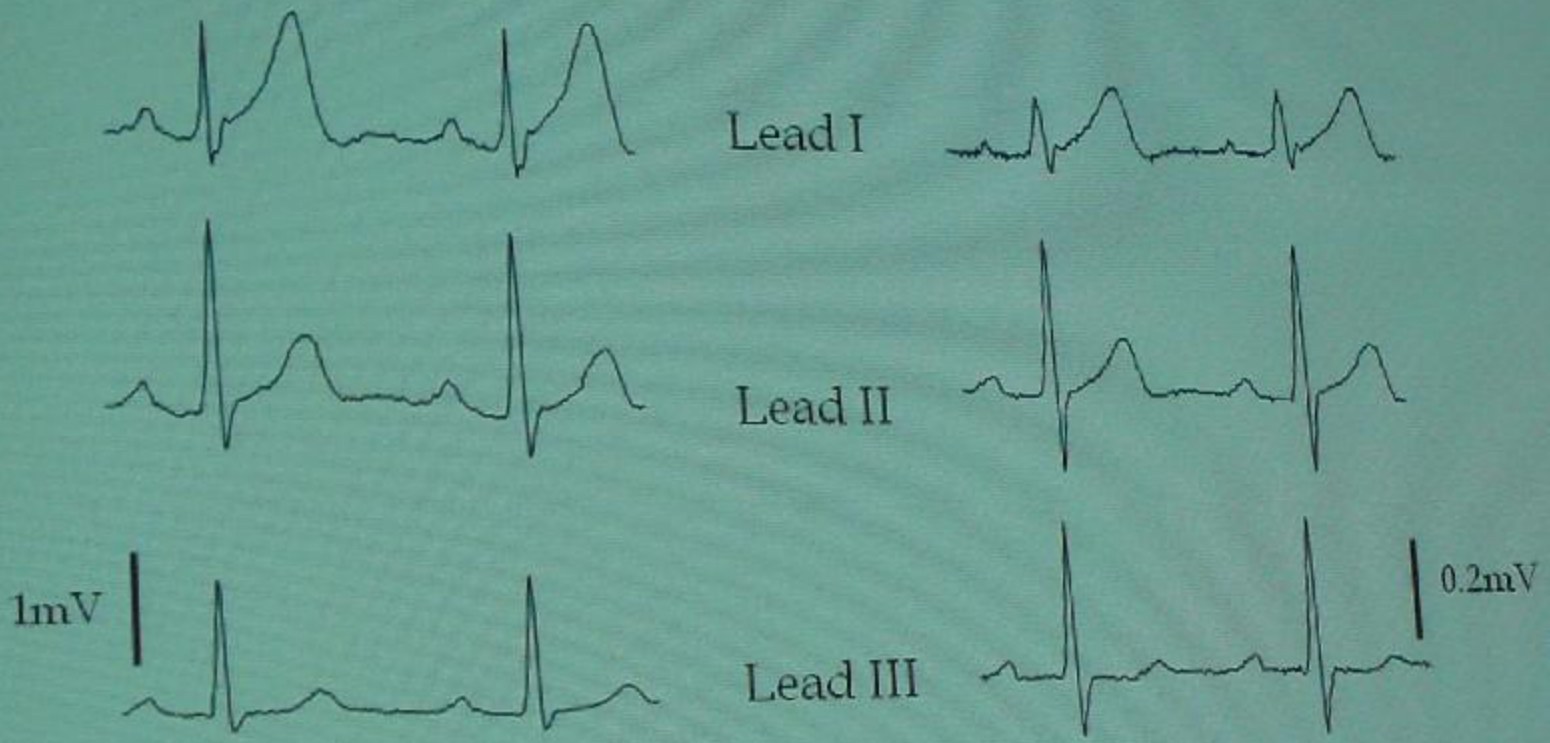


iPro2 Professional CGM is easy for clinicians and patients to use. It includes a disposable glucose sensor and a small data recorder, which automatically record glucose information. This next-generation product is simple to start and significantly reduces the amount of clinical staff time needed to implement the therapy. There is no computer required for setup, patients do not interact with the device, and minimum patient training is required. Patients wear the small, lightweight and watertight device while going about their normal daily activities before returning it to their physicians' office for evaluation.

Bathtub ECG (2)



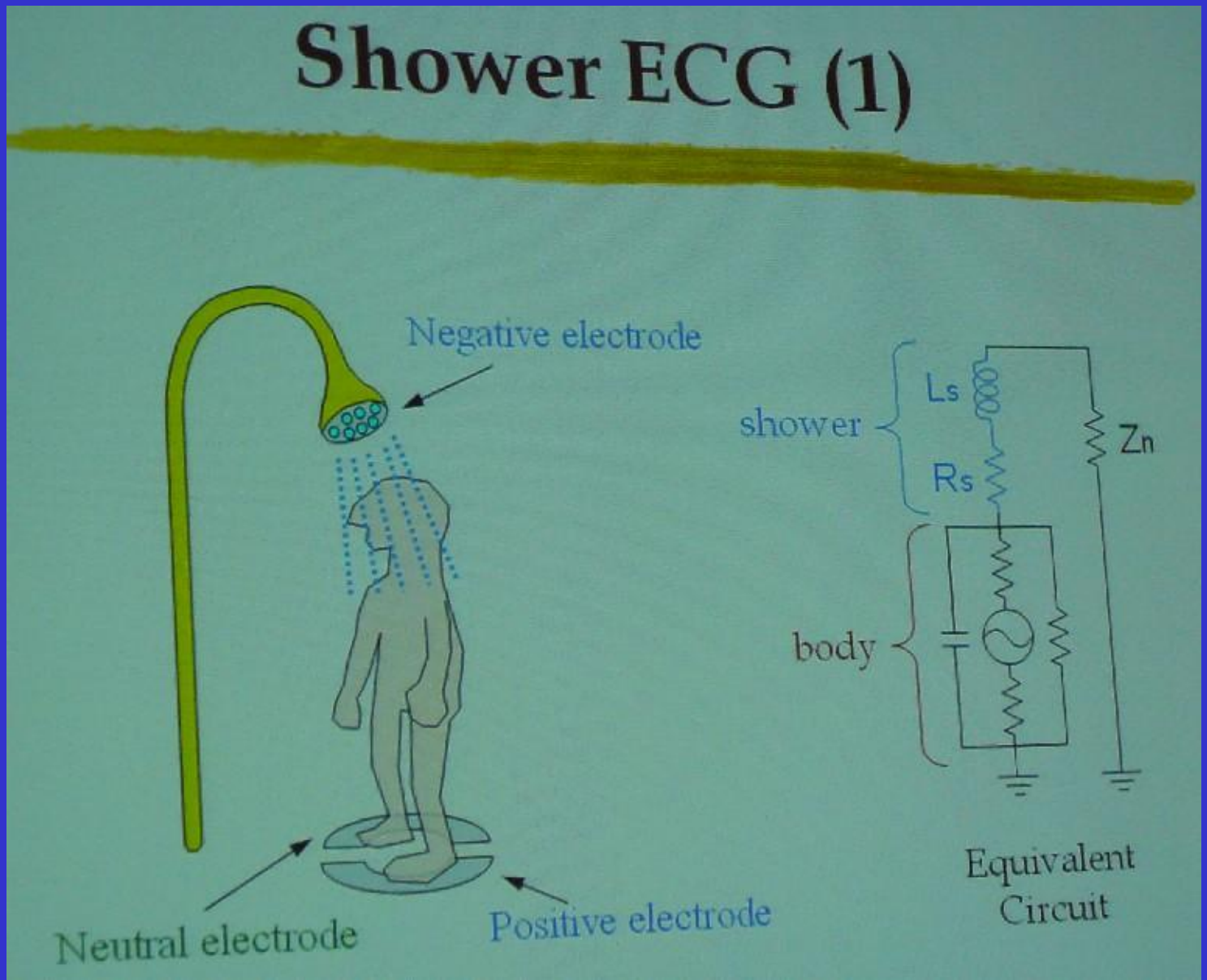
Bathtub ECG (3)



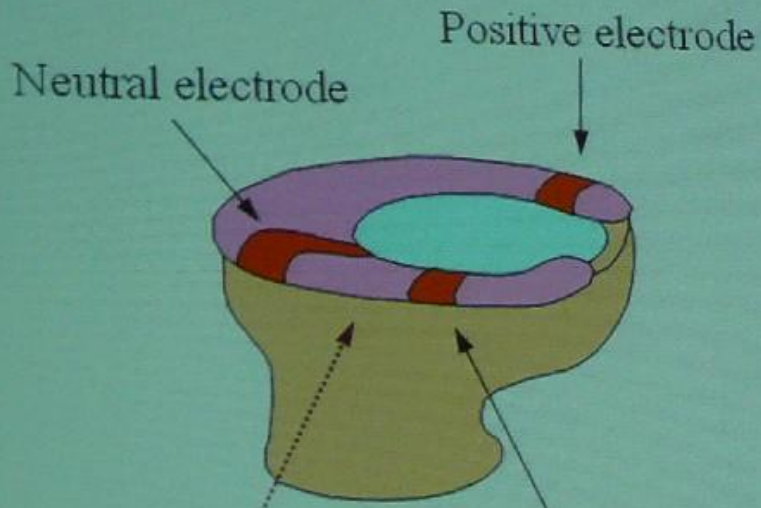
Limb Lead System

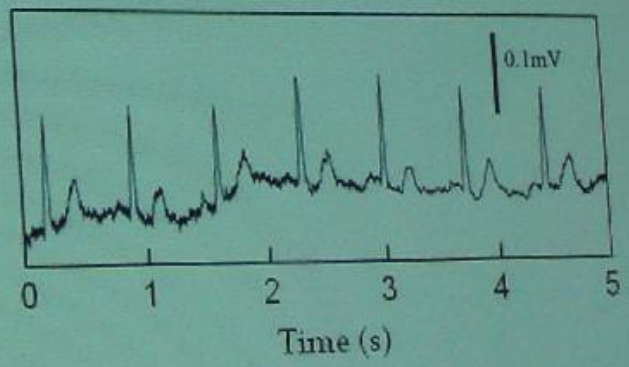
Bathtub Lead System

Shower ECG (1)


Negative electrode
Neutral electrode
Positive electrode
shower
Ls
Rs
Zn
body
Equivalent Circuit

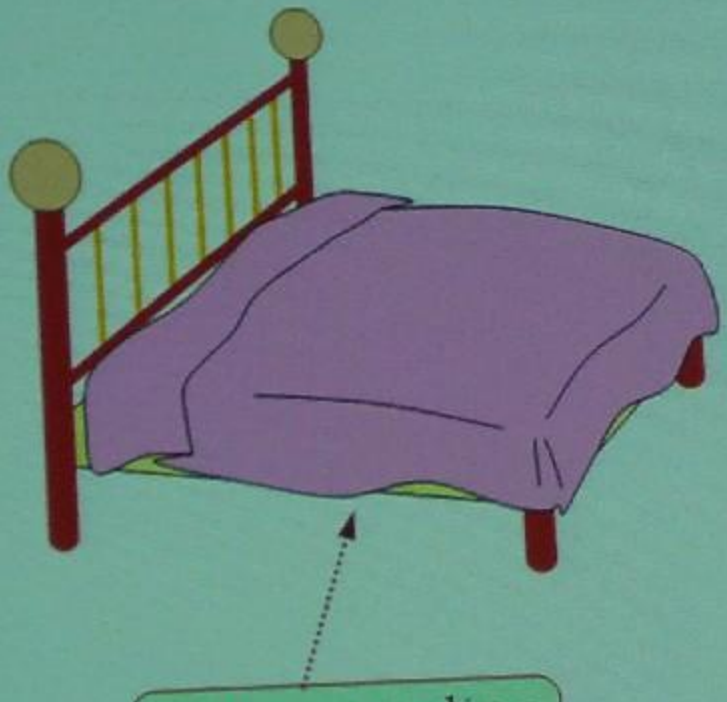
Stool ECG (1)





Auto-recording Pressure Switch

Bedroom Monitoring



- Respiration
- ECG, heart rate
- Body weight
- Body temperature
- Body movement
- Perspiration

Method

- System Configuration -

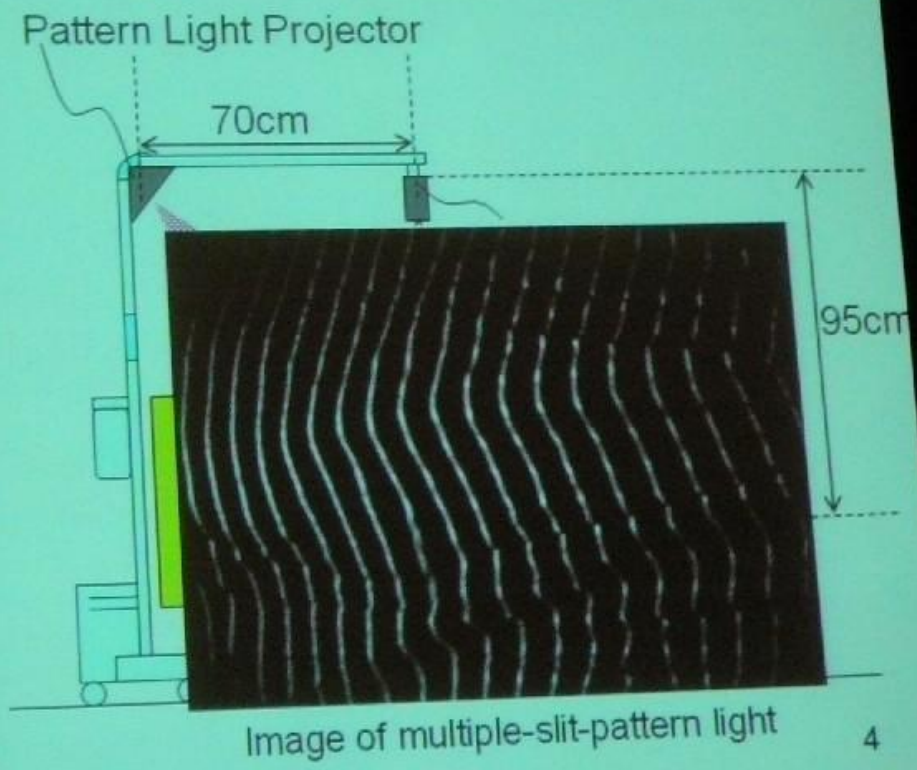
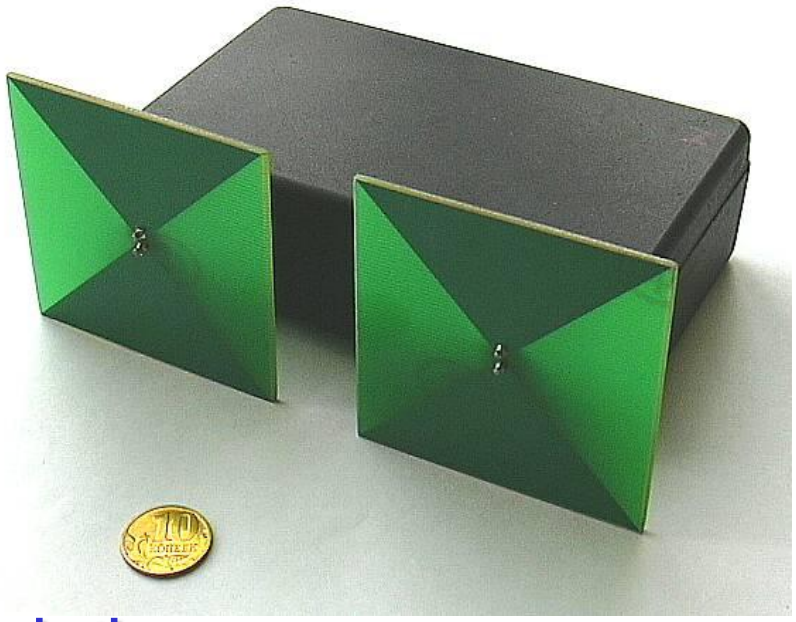
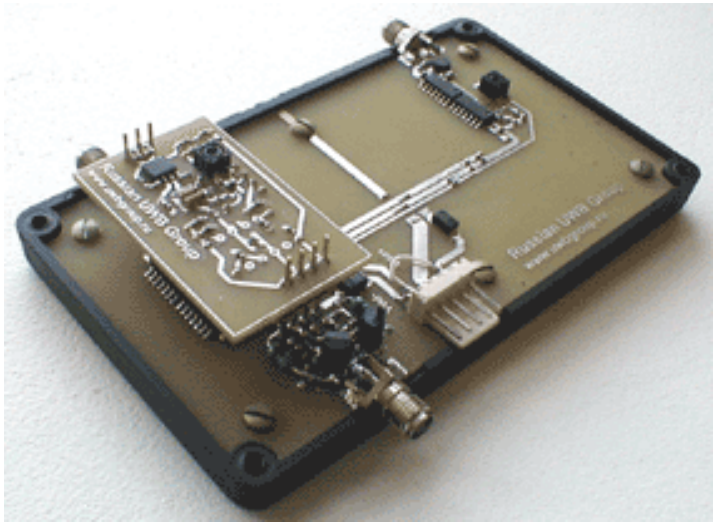


Image of multiple-slit-pattern light

Radar for remote measurement of breath and a heart activity

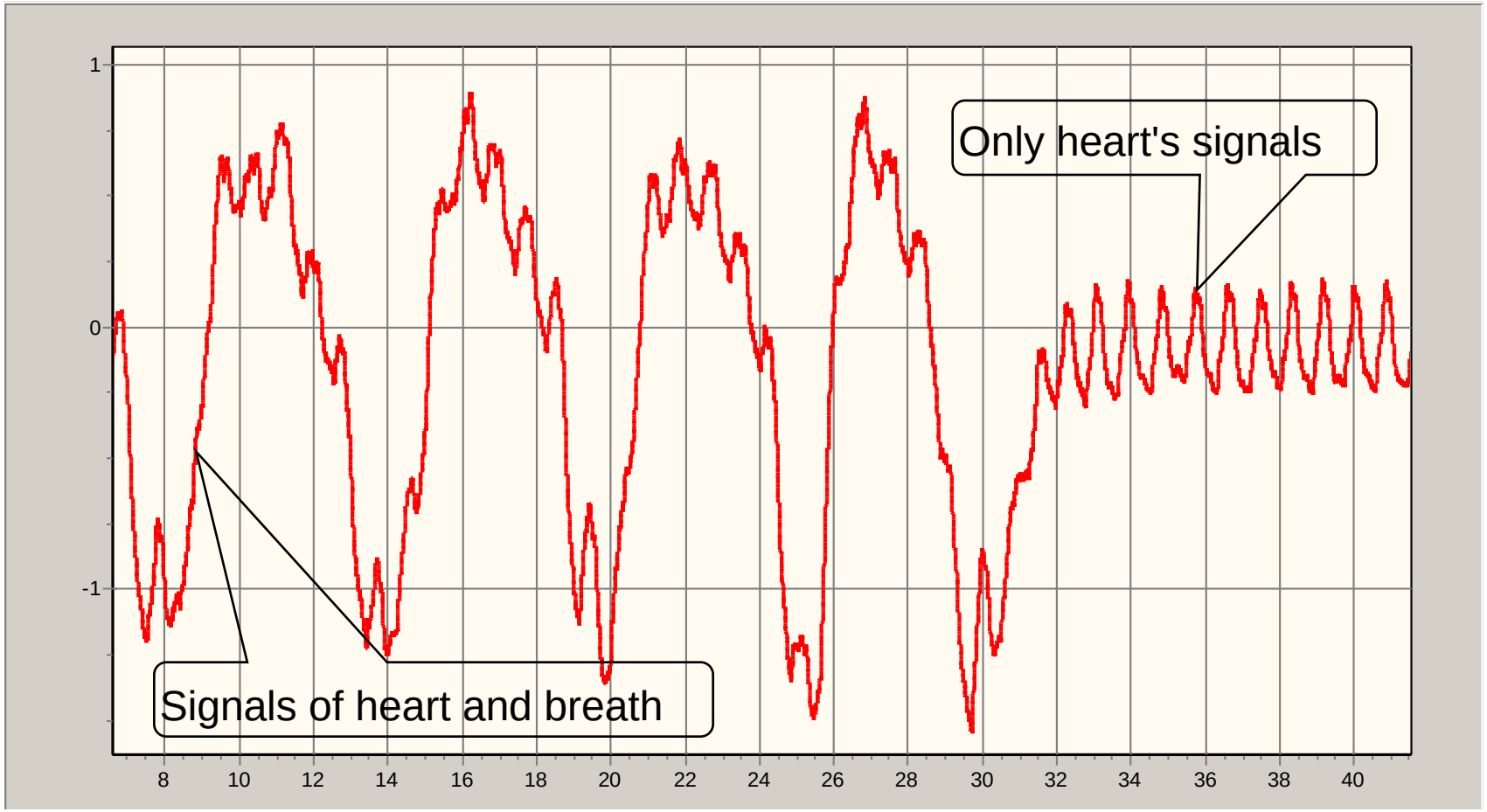




Characteristics

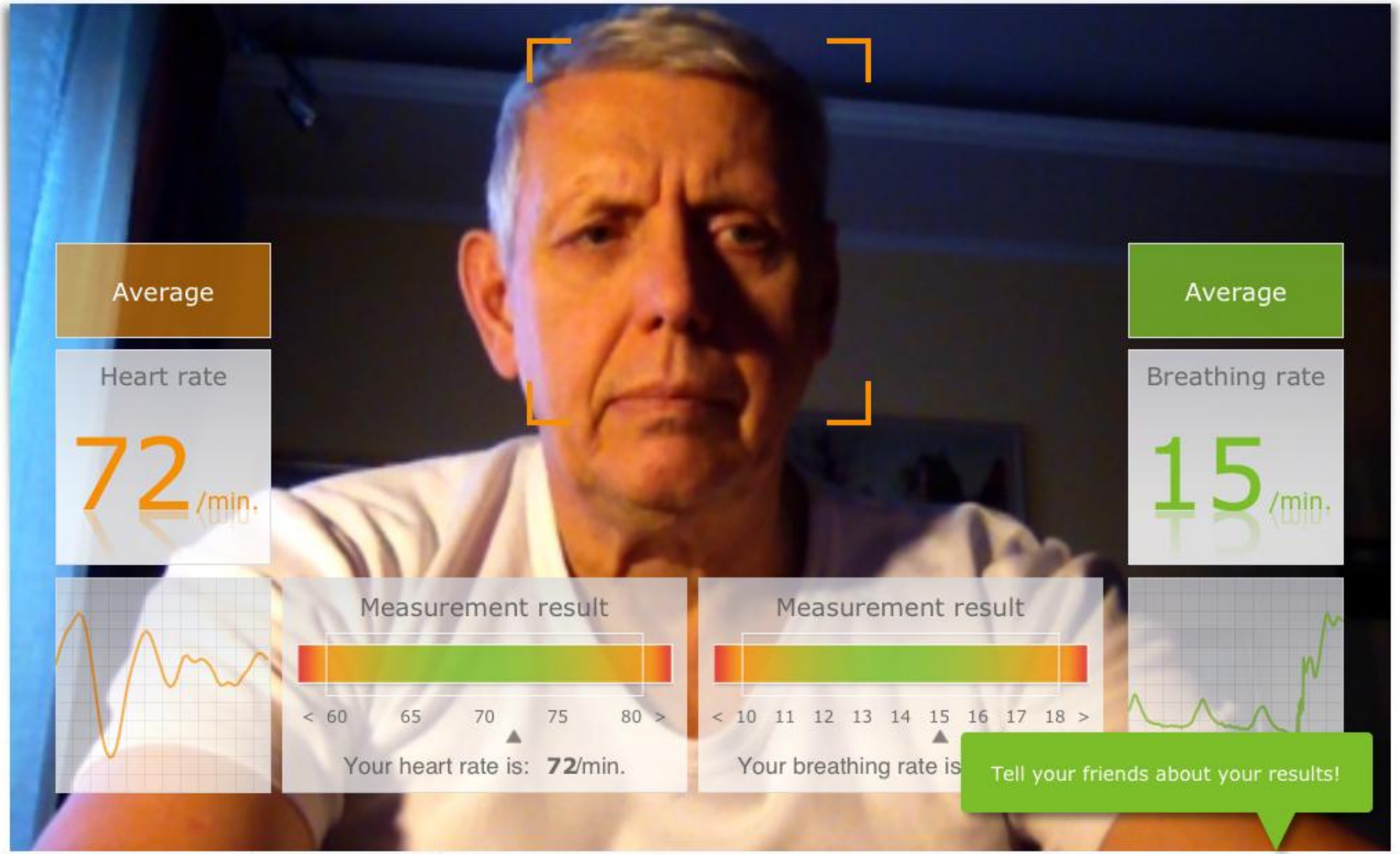
Duration of a pulse 200 ps;
Average power < 0.04 μW;
Range of action: 0.02- 5 m;
Density of a flow emission power
less than 0.1 mW/cm^2

Output signal of radar during breath and when breath is stopped



PHILIPS
sense and simplicity

VitalSigns Camera



Measure | Results | How it works | About | Settings | Share

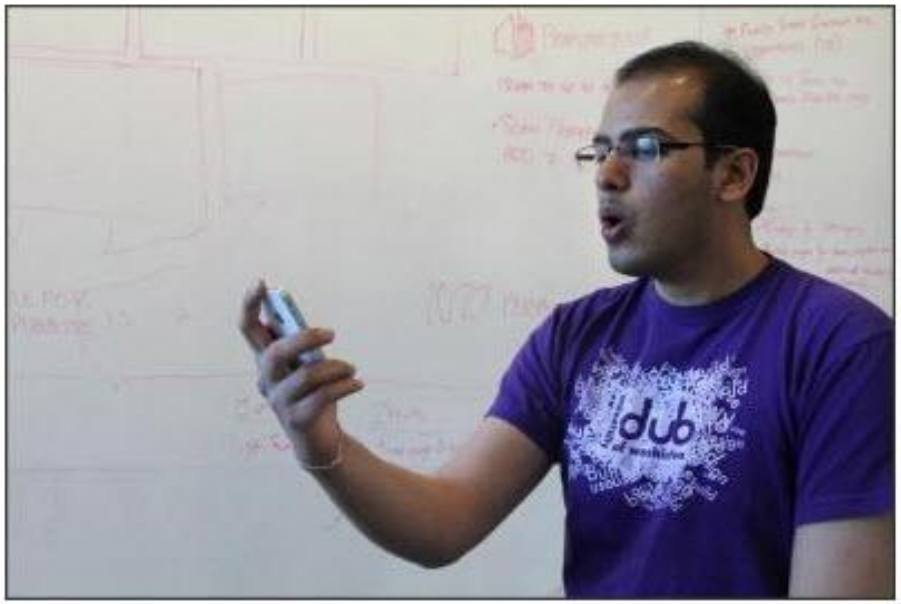
SpiroSmart

Caption: This shows the SpiroSmart phone.

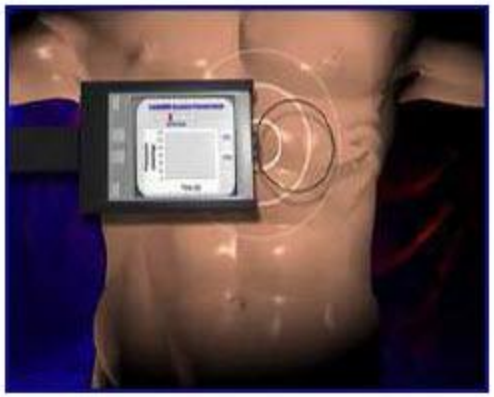
Credit: S. Patel, Univ. of Washington

Contact: Hannah Hickey
hickeyh@uw.edu
206-543-2580
University of Washington

Using SpiroSmart

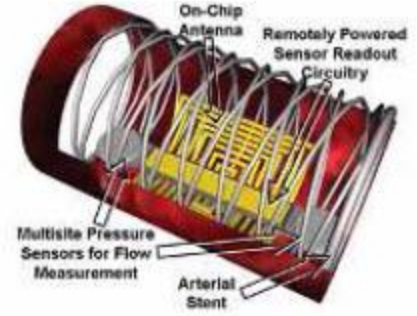


RF-Sensors on / in body



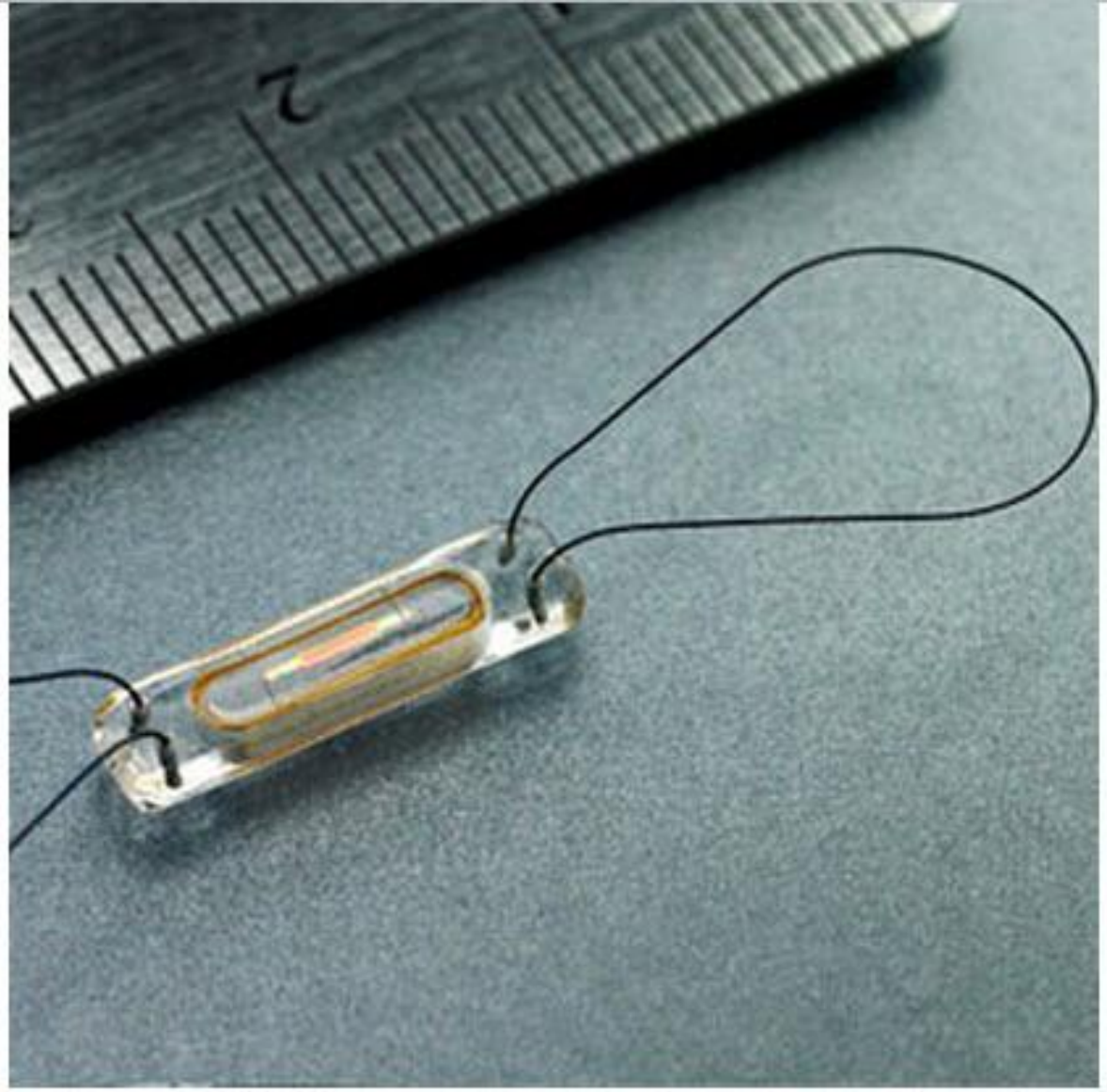
in body sensors

- Functions:
  - Measure pressure/load
  - Measure bacterial activity
  - Measure temperature
  - Drug delivery
- RF-powerless (Senstenna)
- Flat, reading outside body (frequency up to 400 MHz)



Implantable RFID-based sensors

The CardioMEMS Interrogator cart contains a 15" touchscreen monitor and lightweight, ergonomically designed Antenna. During the EVAR procedure, the cart's Antenna transmits RF energy to the sensor. The circuit inside the sensor is charged by the RF energy. The sensor returns a resonant frequency signal back to the Antenna, which is translated by the electronics to a pressure measurement.



TELLTALE HEART MONITORING: This small sealed sensor keeps tabs on artery pressure in heart failure patients, transmitting information wirelessly to doctors.
Image: OSU MEDICAL CENTER/CARDIOMEMS

Alere Health & Wellness solutions for point of care

Day Link Monitor for managing long-term conditions

INRatio®2 PT/INR monitoring system for anti-coagulation

Triage® System for diagnosis and management of heart failure

epoc for blood gas analysis

Heart Check System ®
Patient Self Testing
BNP for HF Monitoring

LDX® System for health checks and cholesterol testing

Interoperable devices roadmap into a 'common enterprise wide' platform

Alere with an installed base of Telehealth monitoring systems in some 65,000 homes

Report Finds a Heavy Toll From Medication Errors

By GARDINER HARRIS
Published: July 21, 2006

WASHINGTON, July 20
and
natic
in a

WWW.MADISON.COM/WSJ

State:

St. Mary's Hos

By DAVID WAHLBERG
dwahlberg@madison.com
608-252-6125

Problems at St. Mary's Hospital that led to a 16-year-old girl's death from a medication mix-up during childbirth are so serious they pose "an immediate threat" to patient safety, says a federal warning letter re-

correct the problems related to the Fitchburg teen's July 5 death, it will lose its contract

Medicare, the government health plan for seniors and the disabled, generally accounts for

safety," says the letter from

Please see DEATH, Page A5

and the state could revoke its license or ban hospital admissions. Hospital officials say they are complying.

Los Angeles Times

Hospital drug errors far from uncommon

By Rong-Gong Lin II and Teresa Watanabe, Los Angeles Times Staff Writers
November 22, 2007

The case of actor Dennis Quaid's newborn twins, who were reportedly given 1,000 times the intended dosage of a blood thinner at Cedars-Sinai Medical Center, underscores one of the biggest problems facing the healthcare industry: medication errors.

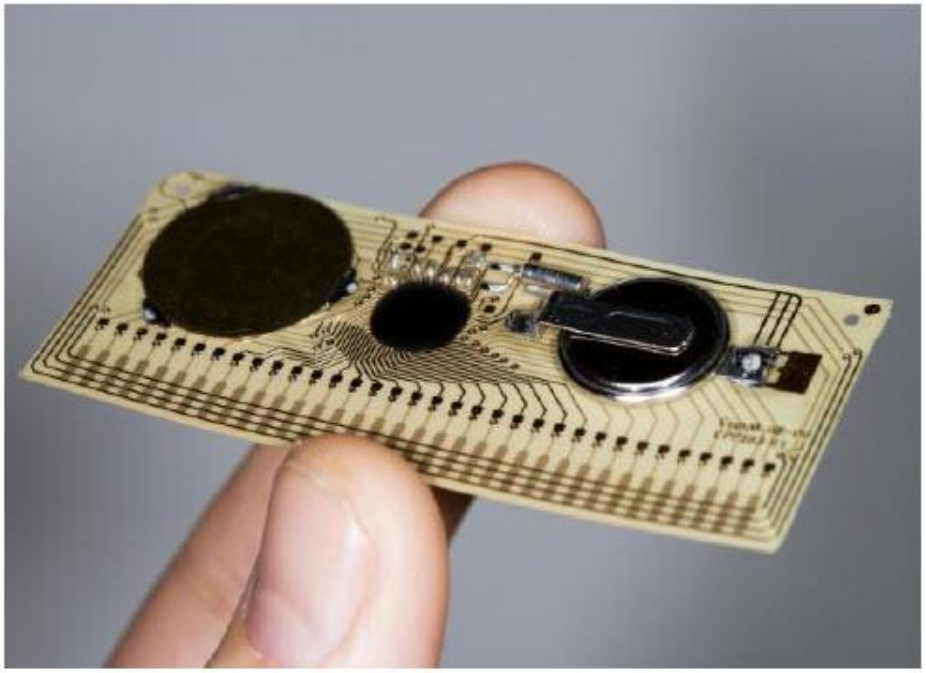
At least 1.5 million Americans a year are injured after receiving the wrong medication or the incorrect dose, according to the Institute of Medicine, part of the National Academies of Science. Such incidents have more than doubled in the last decade.


MedSignals®
The Right Pill. The Right Time. Taken Properly.
SNOOZE
A Smart Pillbox that:
• Reminds you at pill times for 4 key drugs
• Fits in a pocket or purse – You can take it anywhere
• Communicates pill-taking patterns to chart displays
• Helps remote caregivers assist you when needed
Quantity 1 MedSignals Solid Medication Dispenser
Next pill at
19:58
pico

CYPAK

smart, secure and connected

Standard solution for medication monitoring



The CEM083 is a designed as a single component for inclusion in pharmaceutical

Configuration and self-test

Configuration is done by software which is programmed into the chip using the RFID capabilities of the CPK082. Customization may be done either during manufacture and/or prior to use by a pharmacist or care provider.

The module provides a self-test capability that may be used in manufacturing and in the market to ensure that it is functioning correctly.

RoHs

The CEM083 is RoHs compliant.

Applications

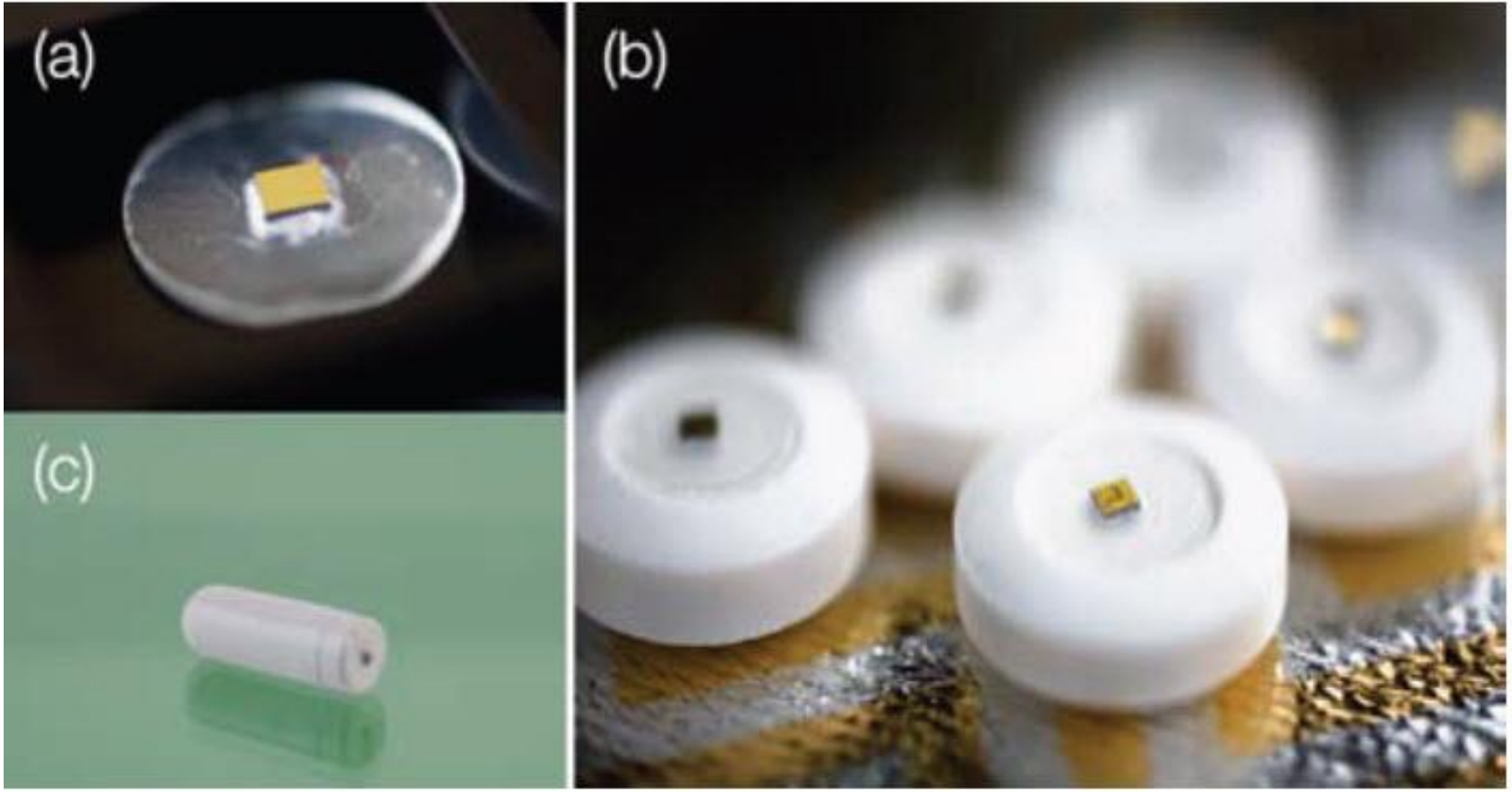


Figure 1. Edible sensor for electronically confirming adherence to oral medications. (a) A closer view of an edible sensor; (b) Edible sensor attached directly to a tablet. (c) Edible sensor co-encapsulated with a drug product using a sensor-enabled capsule carrier.

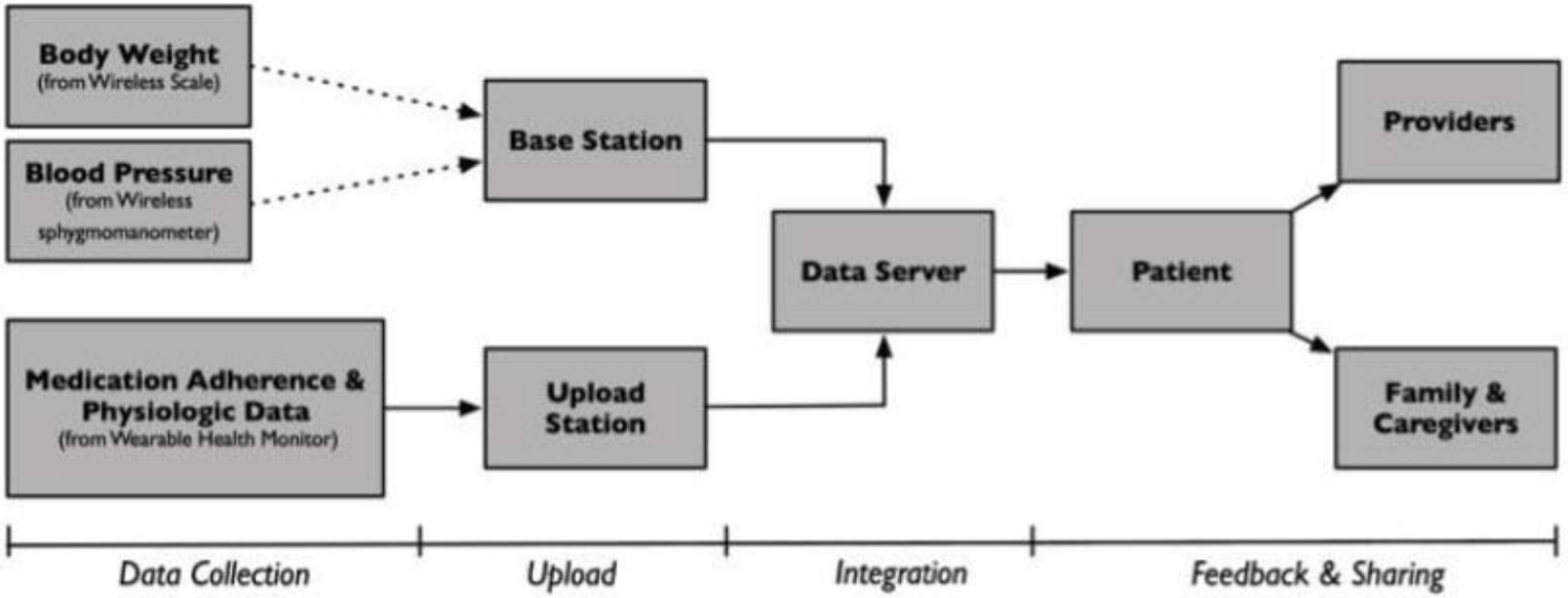


Figure 3. A block diagram showing medication adherence and physiologic data collection, integration, and sharing using a networked wellness system.

Drug Dispencer use decreases number of errors

Published	Medication errors according to the drug dispensing system	
	Traditional*	Unit Dose
Barker, 1969	31.2%	13.4%
Crawley, 1971	26.0%	2%
Barker, 1984	1 error/patient/day	1 error/patient/week

* Collective, Individualized

MEDICATION ERRORS AND DRUG-DISPENSING SYSTEMS IN A HOSPITAL PHARMACY

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Research Article

Use of a Smartphone for Improved Self-Management of Pulmonary Rehabilitation

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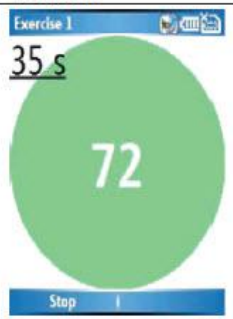
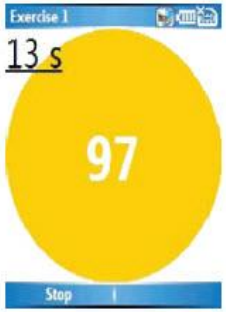
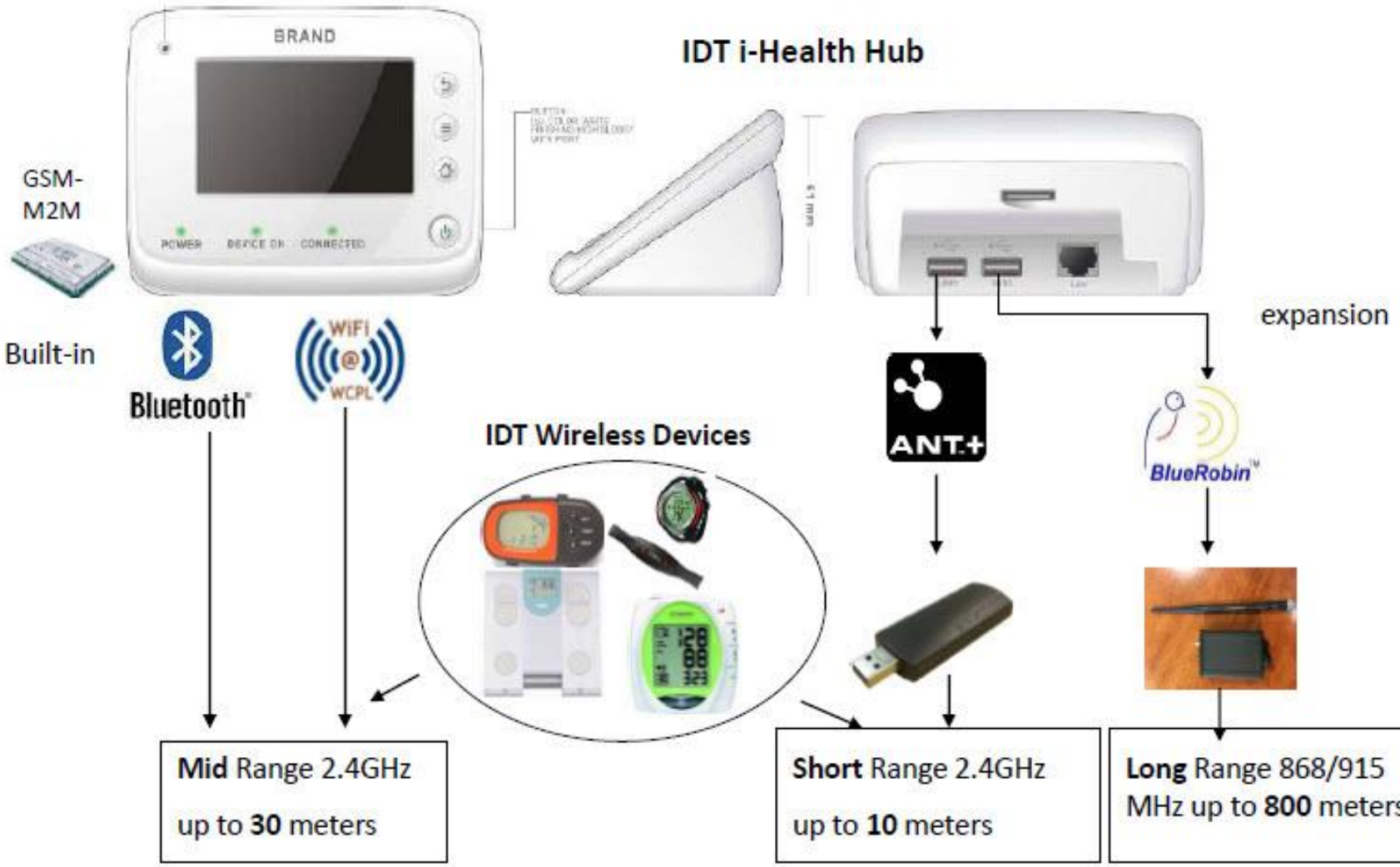
Status	Screen shot	Other details
– Normal physiological conditions – Heart rate within acceptable range specified by clinical professional		– Heart rate shown – Time remaining in seconds shown – Green background
– Normal physiological conditions, but near acceptable limits – Heart rate higher or lower than normal, but still within acceptable range		– Heart rate shown – Time remaining in seconds shown – Amber background
– Dangerous physiological conditions – Heart rate excessively high or low – Exercise should cease now		– LOUD AUDIBLE WARNING SIGNAL – Heart rate shown – Red background – STOP displayed – Display freezes and remains in this state until the Stop button is pressed

IDT i-Hub Wireless Protocols



Necessity to use International Standards