Project: IEEE P802.15 Working Group for Wireless Personal Area Networks   (WPANs)

Submission Title: [Introduction of Medical ICT Consortium in Japan and Official Liaison for IEEE802.15 TG6]

Date Submitted: [July, 2008]

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Company [National Institute of Information and Communications Technology (NICT) and Yokohama National University]

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Abstract: [This document describe introduction of Medical ICT Consortium in Japan to be an official liaison for IEEE802.15 TG6.]

Purpose: [To help discussion in IEEE 802.15.MBAN.]

Introduction of Medical ICT Consortium in Japan and Official Liaison for IEEE802.15 TG6

Ryuji Kohno

National Institute of Information and Communications Technology (NICT),
Yokohama National University

Japanese Government Strategy

- The 3rd Science and Technology Basic Plan in Government (FY2006-FY2010)
  - Promoting R&D of ICT for safe and reliable social infrastructure including medical infrastructure
- Ubiquitous Network "u-Japan Plan" in MIC (FY2006-FY2010)
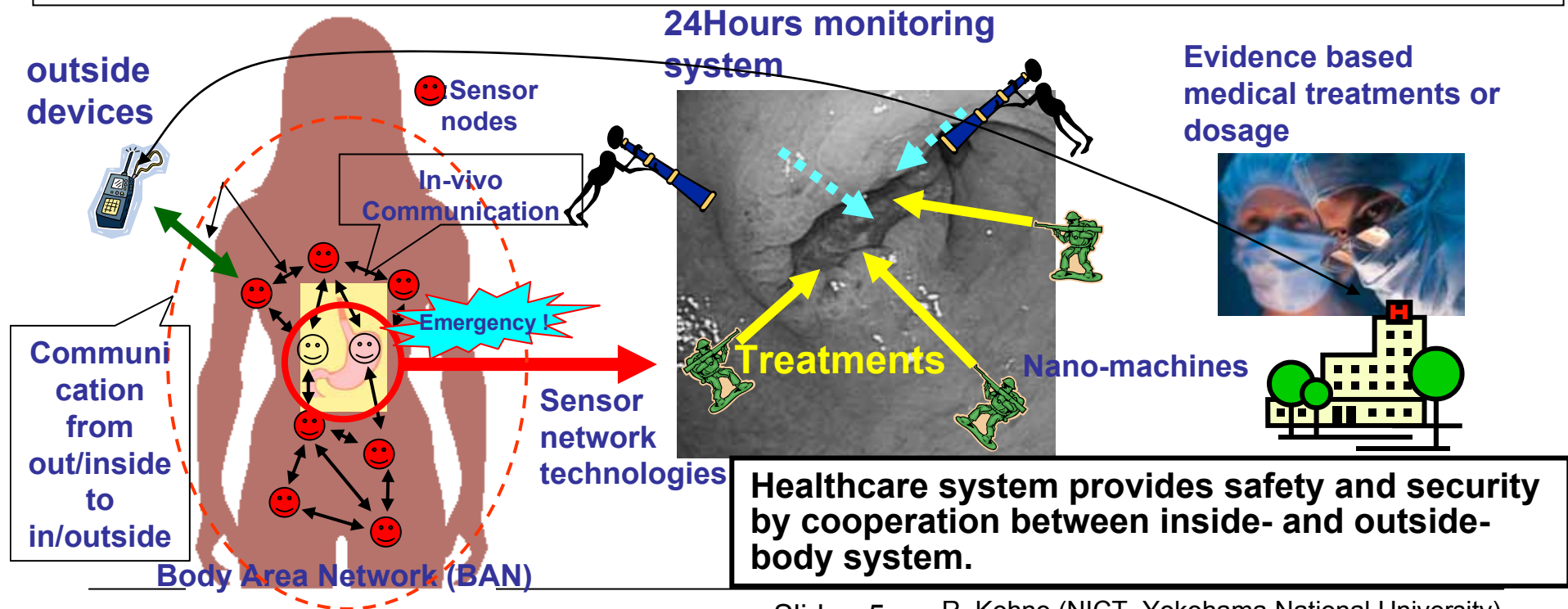 - Establishing Ubiquitous Ad-Hoc Network for Medical Service

NICT (National Institution of Information Communication Technologies) Medical ICT Project

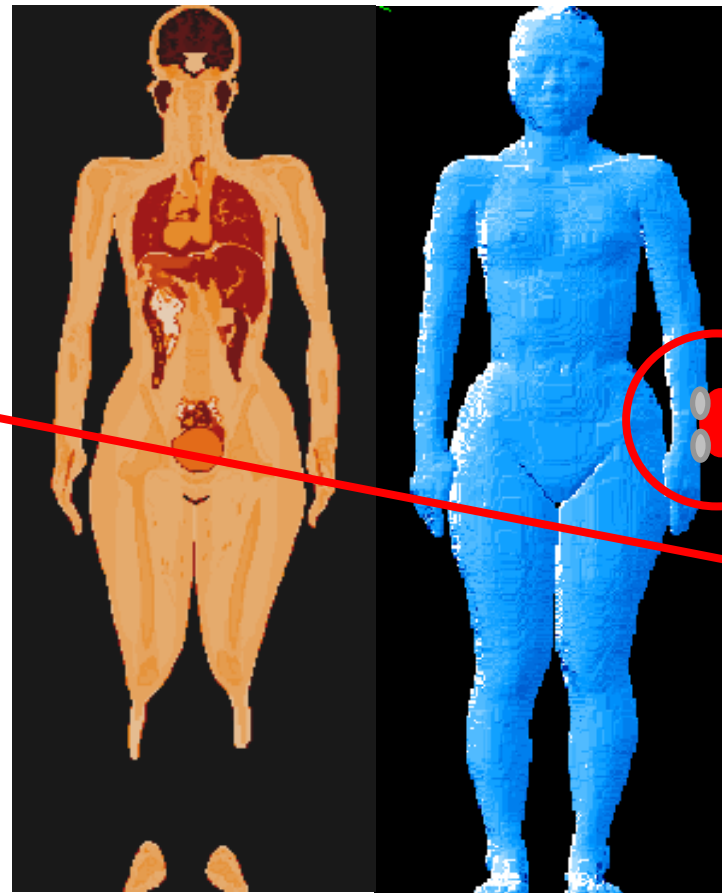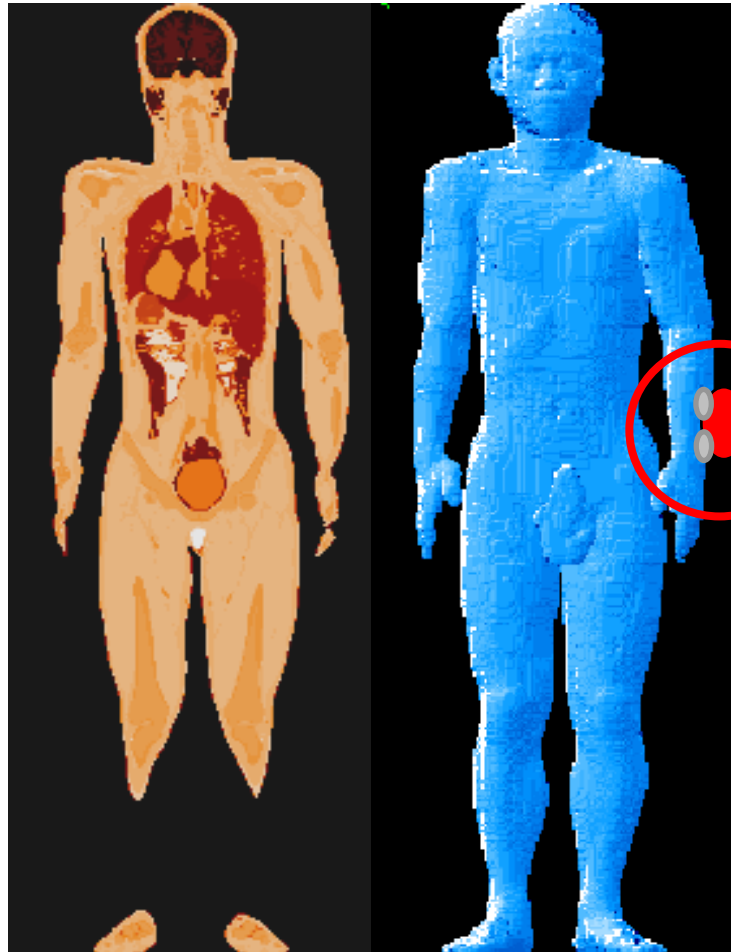**NICT has researched and developed core technologies for Medical ICT, such as**

- **Biomedical EMC Measurement**
  - Safety guidelines for human body

- **Ultra-wideband (UWB) Communications and Positioning**
  - low-interference RF signals for medical equipments and human body

NICT Medical ICT Project

- **R&D of Medical Healthcare Systems Based on Advanced Wireless Technologies Useful to Support Medical Treatments and Diagnosis, e.g. BAN (Body Area Network)**

- **Making Guidelines for Wireless ICT for Medical Uses, i.e. EMC, SAR**

- **Promotion of Standard for Medical ICT Systems, e.g. BAN, MICS**

24Hours monitoring system

Evidence based medical treatments or dosage

outside devices

Sensor nodes

In-vivo Communication

Emergency !

Communication from out/inside to in/outside

Treatments

Nano-machines

Sensor network technologies

Body Area Network (BAN)

Healthcare system provides safety and security by cooperation between inside- and outside-body system.

Slide 5   R. Kohno (NICT, Yokohama National University)

EMC Analysis with High-Resolution Whole-Body Voxel Models of Japanese Adult Males and Females

Given by **NICT EMC Center** Body EMC group **http://www2.nict.go.jp/mt/b186/menu.html**

Wearable Terminal

*Tomoaki Nagaoka,et al., "Development of Realistic High-Resolution Whole-Body Voxel Models of Japanese Adult Males and Females of Average Height and Weight, and Application of Models to Radio-Frequency Electromagnetic-Field Dosimetry " Physics in Medicine and Biology, Vol.49, pp.1-15, 2004.

NICT Medical ICT Project
and Japanese MICT Consortium

Domestic Activities

Cooperation of R&D

International Activities

Yokosuka Research Park (YRP)

Collaboration

International Conferences ; ISMICT06&07

Digital Healthcare Aliance; **CONTINUA**

MAGNET beyond

MOU

MOU

MOU

NICT Medical ICT Project

-R&D, Standardization, Regulation, Collaboration-
· MICT Technology Institute
▪ EMC Institute

University of Oulu, Finland

Other projects ,e.g. e-Health, tele-medicine, etc

over 20 Major Companies

Universities

Proposal & Contribution

Japanese regulator Regulatory Committee

Japanese MICT Consortium
- Two Major Research Groups
- Four WGs in each Group

International Standard: **IEEE 802/1073/11073**

MMAC's Japanese Standardization

Standardization and Regulation activity

International Regulation: ISO, ITU-R

Medical ICT Consortium (Japan)

NTT-AT

OKI

OMRON HEALTHCARE

OLYMPUS MEDICAL SYSTEM

KDDI LAB.

SANGIKYO COORPERATION

SIEMENS

SHARP

TSUMURA RESEARCH LAB.

TOSHIBA

NIPPON SIGNAL NETWORK SYSTEMS

Hitachi

FUJI FILM

FUJITSU

FUJITSU COMPONENT
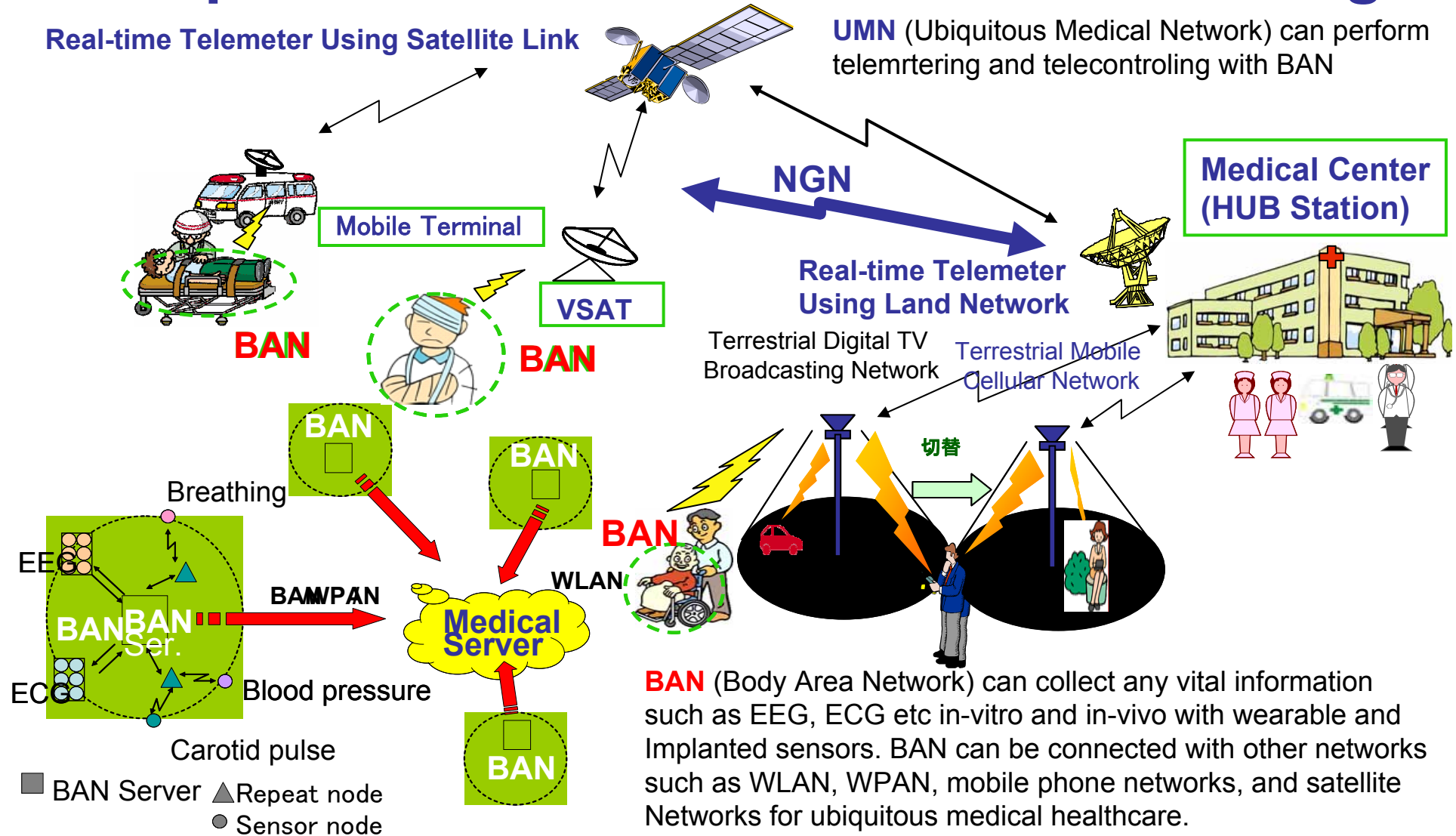
BUSAN TECHSEL ELECTRONICS

MATSUSITA ELECTRICAL

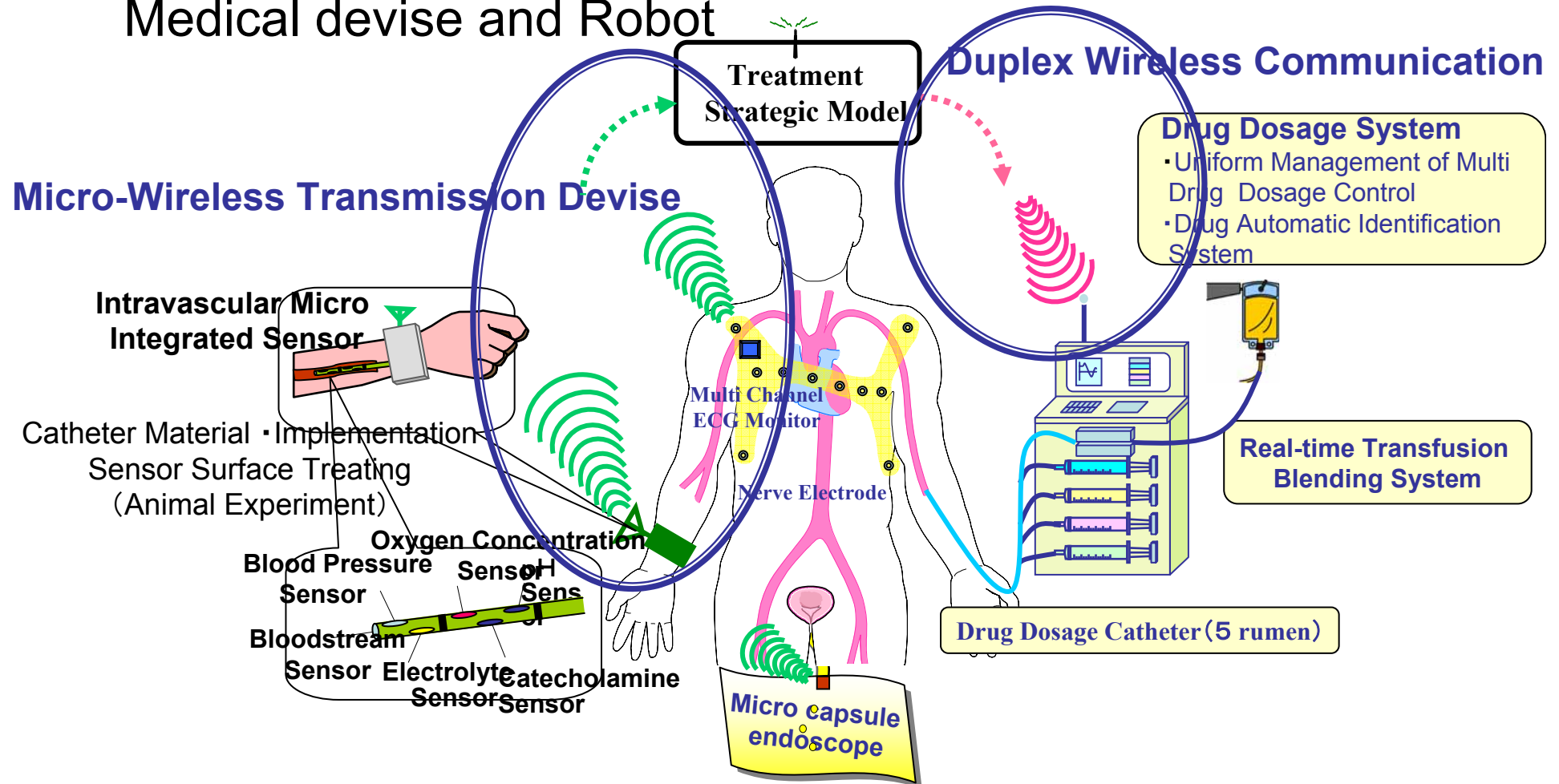TERUMO

YOKOHAMA NATIONAL UNIVERSITY

YOKOHAMA CITY UNIVERSITY
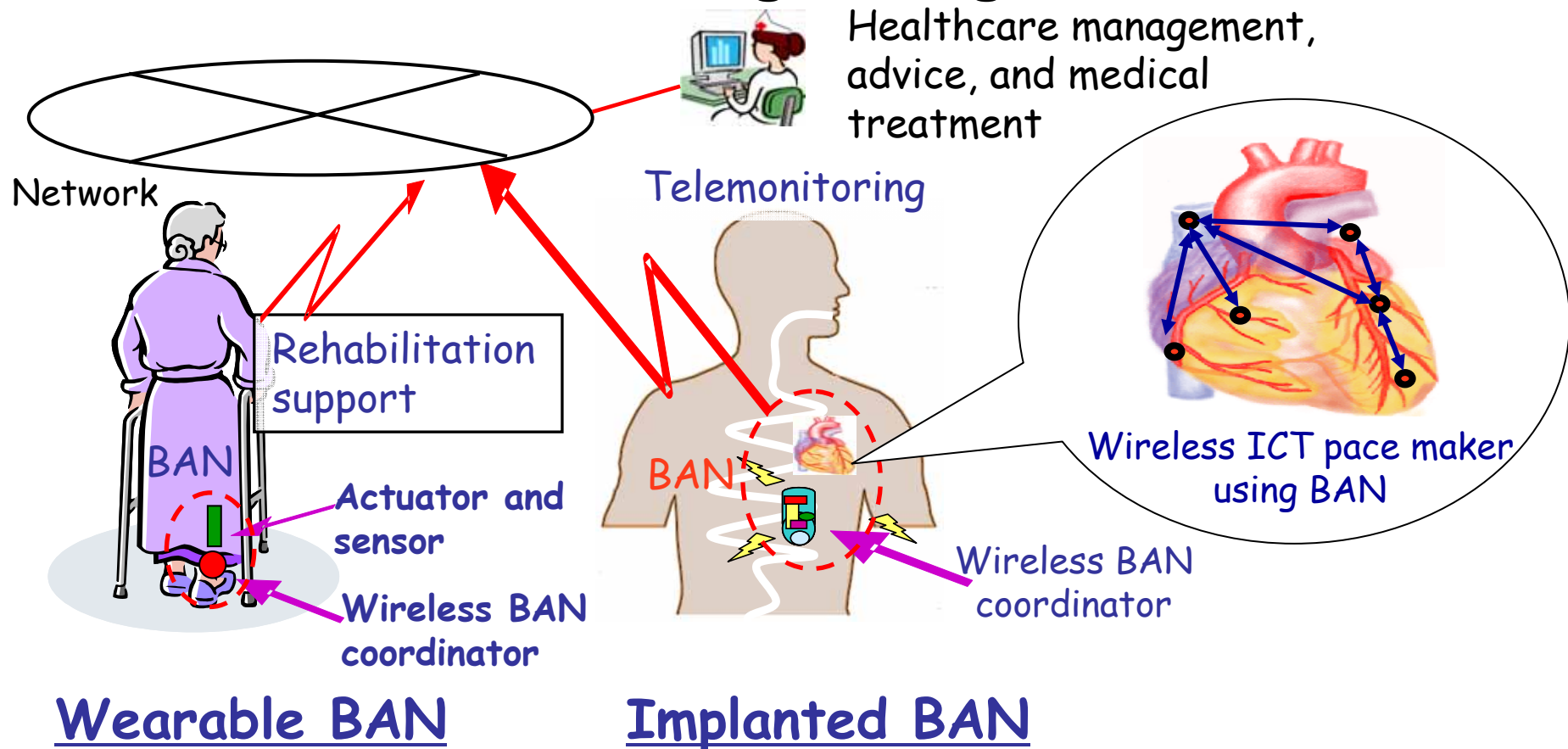
NICT

Ubiquitous Medicine Based on Networking

Real-time Telemeter Using Satellite Link

UMN (Ubiquitous Medical Network) can perform telemrtering and telecontroling with BAN

NGN

Medical Center (HUB Station)

Mobile Terminal

Real-time Telemeter Using Land Network

VSAT

BAN

BAN

Terrestrial Digital TV Broadcasting Network

Terrestrial Mobile Cellular Network

BAN

BAN

BAN

Breathing

切替

EEG

BAN Ser.

BAN **BAN**

BAN/WPAN

WLAN

Medical Server

BAN

ECG

Blood pressure

Carotid pulse

■ BAN Server ▲ Repeat node ● Sensor node

BAN (Body Area Network) can collect any vital information such as EEG, ECG etc in-vitro and in-vivo with wearable and Implanted sensors. BAN can be connected with other networks such as WLAN, WPAN, mobile phone networks, and satellite Networks for ubiquitous medical healthcare.

Slide 9   R. Kohno (NICT, Yokohama National University)

Ubiquitous Medical Care System & Network

Tele-metering of Vital Information and Tele-controlling of Medical devise and Robot

Treatment Strategic Model

Duplex Wireless Communication

Micro-Wireless Transmission Devise

Drug Dosage System
・Uniform Management of Multi Drug Dosage Control
・Drug Automatic Identification System

Intravascular Micro Integrated Sensor

Catheter Material ・Implementation Sensor Surface Treating （Animal Experiment）

Multi Channel ECG Monitor

Nerve Electrode

Real-time Transfusion Blending System

Oxygen Concentration Sensor

PH Sensor

Blood Pressure Sensor

Bloodstream Sensor

Electrolyte Sensors

Catecholamine Sensor

Micro capsule endoscope

Drug Dosage Catheter（5 rumen）

Urinary Output ・Electrolyte Monitor

Medical Body Area Network (BAN)

Effective medical treatment is provided by vital information monitoring through wireless BAN.

Healthcare management, advice, and medical treatment

Network

Telemonitoring

Rehabilitation support

BAN

Actuator and sensor

Wireless BAN coordinator

BAN

Wireless BAN coordinator

Wireless ICT pace maker using BAN

Wearable BAN   Implanted BAN

Requirements to Realize Ubiquitous Medical Care Using BAN

- To realize ubiquitous medical care using BAN, an advanced wireless ICT is required, which support energy efficiency, robustness against interference, high reliability & Safety for human body and so on.

1. Technology Requirement;
- EMC to protect human body & medical equipments against radio
- Propagation analysis & channel modeling of BAN
- High precision positioning & broadband communication with high reliability
- Highly Secure network to protect privacy of personal vital information

2. Regulation Requirement;
- Guideline to use wireless BAN safely compliant to both FCC and FDA
- New frequency band for medical use

3. Business Requirement;
- International standard to expand a market size
- Sophisticated Business Models

R. Kohno (NICT, Yokohama National University)

http://green.ilcc.com/_ismict/

ISMICT 2006

2006 International Symposium on Medical Information and Communications Technology

Hepburn Hall, Yokohama City University, Yokohama, Japan
December 1-2, 2006

FIRST CALL FOR PARTICIPANTS

The 2006 International Symposium on Medical Information and Communications Technology (IS-MICT2006) will be jointly organized by Yokohama National University (YNU), Yokohama City University (YCU), and National Institute of Information and Communications Technology (NICT), and hold at Hepburn Hall in Fukuura Campus, Yokohama City University, Yokohama, Japan, during De-

General Chair:
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Yasuo Kokubun (YNU)
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http://www.mict.ynu.ac.jp

Third International Symposium on Medical ICT(ISMICT2009)

Montreal
Canada

ISMICT CANADA

WELCOME   CALL FOR PAPERS   CONFERENCE PROGRAM   SPONSORS & EXHIBITIORS   REGISTRATION   GENERAL INFORMATION   CONTACT

FIRST CALL FOR PAPERS

"Emerging wireless information technologies" & "Applications for healthcare" are the central themes for the Third International Symposium on Medical Information and Communication Technologies (ISMICT) to be held in Montreal, Canada, on 24 - 26 February 2009. It will be an international inter-disciplinary effort towards better understanding and predicating how wireless technologies will impact on medical practice.

PRINT

SCOPE

Healthcare is starting to adopt new technologies in wireless medical informatics that promise to overcome current healthcare-delivery limitations being experienced by both patients and physicians. This fast growing interest in technical innovation combined with today's medical knowledge explosion is creating demands on physicians, academics and patients, which require novel and broader paradigms in healthcare where wireless mobility is now expected everywhere.

Topics of interest will include, but are not limited to, the following:

- Cost or benefit considerations in wireless healthcare
- E-Health & citizen centered care
- Hardware architecture for medical & biomedical ICT (Information & Communication Technology)
- Networks for mobile telemedicine & biomedical informatics
- Use of location information in healthcare, including personnel, patient & asset tracking
- Sensing & transmission of vital signs by wireless networks
- Telemedicine, telediagnosis & telesurgery
- Wireless body area networks
- Wireless hospital design & construction
- Wireless-safety/patient-safety as part of hospital certification process
- Wireless security & privacy in healthcare
- Wireless medical & biomedical measurements
- Wireless patient tracking in disaster management

Special Sessions   **Regular Sessions**   **Panels**

PAPER SUBMISSION

Authors are invited to submit full papers (see **www.ismict2009.org**) to the Technical Program Committee no later than September 26, 2008 according to the following schedule: .
September 26, 2008 -Paper submission deadline
November 28, 2008 -Paper acceptance/revision notice
December 12, 2008 -Final paper due

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George Sandor MD. University of Toronto, Canada
Honorary: Arthur Porter MD. Director General & CEO, MUHC, Canada
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KEYNOTE & INVITED SPEAKERS

Please check back frequently for news about our insightful and thought-provoking keynote and invited speakers.

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24-26 Feb., 2009
McGill University, Montreal, Canada

http://www.ismict2009.org/

Conclusion

- Medical ICT Consortium coordinated by NICT with over 20 companies has been introduced because it is requested to be an official liaison of IEEE802.15. TG6.

- Medical ICT Consortium has contributed in R&D, Regulatory and Standardization of medical ICT systems such as BAN.

- Medical ICT Consortium would like to commit in any activities to make BAN successful in business and social services.