

**PROJECT TITLE: THE DEVELOPMENT OF DIGITAL SMART HOSPITAL USING RFID (RADIO FREQUENCY IDENTIFICATION)**

**Project team members**

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**Objective:**

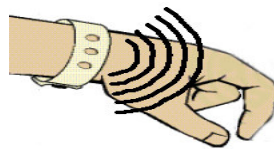
To implement a digital community using RFID at USM Hospital

**Introduction:**

A digital hospital, similar to other community like a campus is a hospital that is fully served by digital infrastructures and other digital facilities, such as computers, servers, databases etc, such that all medical services, administrative processes, access of patients and other information can be carried out through digital network infrastructures, computers, fixed and mobile communications facilities].

In the case of a hospital in Thailand, with the introduction of a digital hospital, the workflow is optimized, e.g. patient data, administrative records, in fact all documents are electronically input. Medical images are digitized, available promptly in doctor's offices. All Hospital Information System (HIS) are integrated on one Application Platform and Database. The results are: 40 % growth in outpatient volume without adding IT overhead (3000 patients/day) [2].

Patients are processed in 45 minutes from registration to prescription pick-up. There is 33% gross profit margin. All medical images are archived on one server, and the file storage room is converted to profitable children's clinic.



An example of a Patient RFID wrist band

In this work package, a medical data sensor system platform is designed with help of RFID, fixed- and wireless communication and the data will be gathered in a Data Mining Server.

The signal quality and system timing during signal transfer process for both wireless LAN and RFID connections will be ensured using the standard RF measurement for RFID, and the detected collision and its probability will be analyzed, using the model and simulation tools.

Gathered data in a Data Mining Server from a smart hospital can create a country-ranged medical information system. It might be a little bit annoying for physicians, who generally don't

like to fulfil any documents, but indeed it might have a great impact for patients' healthcare service.

Another issue to be researched in this project is data privacy and protection from hackers' attacks, as this network should be extremely secured.

Data exchange via the Data Mining Server to the vehicle information system, building, campus and banking system can ensure efficiency, accuracy and supports in time of emergency.

### **RFID benefits in healthcare & Smart Hospitals.**

1. Patient Identification.
2. Blood Tracking.
3. Smart Operating Theaters.
4. Anti-Counterfeiting.
5. Tracking Equipments, Patients, Staff and Documents.
6. Avoiding thefts of Medical Equipments.

### **Project Deliverables:**

- Malaysian made active and long range RFID system
  - DataRFID - Integrated Database Management System
  - Testing tools for RFID software development system
  - Sensor Network Platform System using RFID in a Fixed- & Wireless Local Area Network
- Implementation Reports for the Sensor Network Platform in a Fixed- & Wireless Local Area Network, tentative planned for Hospital.

### **Related publications & works**

[1] Advanced Topics on Data Communication, Prof. Dr. Otto Spaniol, Lehrstuhl fuer Informatik IV, RWTH Aachen, Germany, presented at UNAI, Lembang, Bandung, Indonesia, 27 November – 9 December 2005

[2] Delivering Nanotechnology: Intel leadership in Digital Economy, Christanto Suryadarma, Regional Sales Director Intel Asia Pacific, Presentation at Multipolar, March 10, 2005

[3] Prof. Dr.-Ing. Jochen Schiller, Bluetooth & RFID Presentation, Freie Universitaet Berlin, SS 2005

[4] RFID : The problems of Cloning & Counterfeiting, Ari Juels, RSA Laboratories, 19 October 2005

[5] Irene Lazarusli, Samuel Lukas, Toni Anwar, Isabel Lay, RFID as an identification technology replacing barcode, Journal Faculty of Computer Science, Universitas Pelita Harapan, Vol.3 No.2, May 2005 ISSN : 1412-9523

[6] A.C.C. Systems Inc. Supplies RFID Technology as part of ScenPro's TacMedCS Program Helping the United States Navy Track Wounded in Iraq, [www.accsystemsinc.com/news\\_5\\_27\\_2003.htm](http://www.accsystemsinc.com/news_5_27_2003.htm)

[7] Dr. Toni Anwar, presentation of Digital Campus, UPH October 2004, Karawaci, Indonesia

[8] Agilent Technologies Application Notes AN 1488, 2005-07-29, "Agilent Ultrawideband Communication RF Measurement", [www.agilent.com](http://www.agilent.com)