Secure and Intelligent Implantable Medical Devices

Dr. Michael Hutter

Institute for Applied Information Processing and Communications (IAIK),
Graz University of Technology
“Health Care / Pharmaceutical” - Industry Track:

- „Hospital Expands RTLS Usage Beyond Asset Management“
- “Hospital Improves Hand-Hygiene Compliance With RFID”
- “Improving Patient Outcomes and ROI With RFID”
- “Hospital Identifies Recalled Drugs Via RFID”
- “Improving Infusion Pump Usage and Utilization With RFID”
- “NFC Assists Hospital in Administering Medication”

http://www.rfidjournalevents.com
Will be in Chicago in December 2014

- Hear early adopters share the results of real-world deployments
- Get answers to your questions regarding the benefits that can be achieved
- Gain valuable insights into the proper RFID technologies to employ for various applications
- Learn best practices and find out how to avoid common pitfalls

http://www.rfidjournaalevents.com/healthcare
ARCHIMEDES

- Research action in the US
  - Focuses on research and education to improve (RFID-based) medical device security

- Involvements:
  - University of Michigan
    (Director: Prof. Kevin Fu)
  - Harvard Medical School/
    Clinical Research Institute
  - University of Washington
  - University of Tennessee

- [http://secure-medicine.org/](http://secure-medicine.org/)
Related Initiatives in the US

- **SHARPS Project**
  - Huge consortium…
  - United States Department of Health and Human Services (HHS)
  - National Coordinator for Health Information Technology (ONC)

- **RFID Consortium for Security and Privacy (RFID-CUSP)**
  - University of Massachusetts
  - Georgetown University
  - ETH Zurich
  - RSA Labs
SMART-IMDs

- Planned research project entitled:
  “Secure and Intelligent Implantable Medical Devices”

- Action aims to develop secure, reliable, and smart IMDs
  - Pacemakers, implantable cardiac defibrillators (ICDs), drug pumps, neurostimulators, etc.

- European consortium:
  - Spain, UK, Czech Republic, Sweden, Belgium, Austria, Slovakia, Turkey, Greece, Germany, The Netherlands, Norway
Practical Example 1

2008: Halperin et al. showed that adversaries can:
1. Read and change information stored in ICD memories!
2. Turn them off!
3. Issue life-threatening shocks!
Attack #2: Favesdrop Private Info

Implanting physician

Diagnosis

Also:
Device state
Patient name
Date of birth
Make & model
Serial no.
... and more

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Graz, 13.02.2014
Sniff Vital Signs or Drain Energy

“Are you sleeping?”

“No!”

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Practical Example 2 – “Insulin Al Qaeda“

2011: Jay Radcliffe: commercial insulin pumps have wireless connectivity but no security protection mechanisms!

He identified flaws that could allow an attacker to remotely control insulin pumps and alter the readouts of blood-sugar monitors.

Taiwan Information Security Center (TWISC)

- Part of the National Taiwan University of Science and Technology (NTUST)
- Prof. Nai-Wei Lo – Director of the Integrated Digital Services Laboratory (IDSL)
- RFID Activities:
  - Integration of RFID technology with health-care management systems
  - User privacy
  - „Medicine dispatching safety and inpatient/outpatient clinic”
- [http://idsl.cs.ntust.edu.tw/director](http://idsl.cs.ntust.edu.tw/director)
Thanks for your attention!

Dr. Michael Hutter
IAIK – Graz University of Technology
michael.hutter@iaik.tugraz.at
www.iaik.tugraz.at