

# Security Considerations in M2M Communications

Applied Research Issues & Projects in  
the Austrian Institute of Technology (AIT)

**Dr. Markus Tauber**

Project Manager, ICT Security,  
Future Networks and Services,  
Safety & Security Department

[markus.tauber@ait.ac.at](mailto:markus.tauber@ait.ac.at) | +43 664 8251011 | [www.ait.ac.at/it-security](http://www.ait.ac.at/it-security)

# Overview

- Who we are and what we do
  - Organisation
  - Department
  - Research topics
- How we address research topics in projects
  - Running
  - Coming
  - Planned
- Get involved: User and Advisory Board



Federal Ministry for Transport,  
Innovation and Technology

50,46%



Federation of Austrian Industries

49,54%



**Austrian Institute of Technology (AIT)**

Seibersdorf  
Labor  
GmbH

Nuclear  
Engineering  
Seibersdorf

Health &  
Environment

Safety &  
Security

Energy

Mobility

Foresight &  
Policy  
Development

- ~ 1.100 Employees
- Budget: 120 Mio. €
- Business Model  
40:30:30

# AIT R&D Program – Safety & Security Department

Model based testing  
system safety

## System Safety

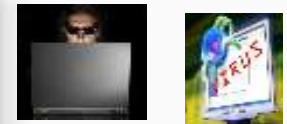
### Highly Reliable Software and System– Safety

- Highly Reliable Soft- and Hardware

## ICT – Security

### Future Networks and Services

- eGovernment
- secure smart grids
- secure cloud computing



**critical infrastructure**



## Data Safety

### Digital Memory Engineering – Safety

- management of large and komplex Data
- eGovernment,..

## Infrastructure Security

### Intelligent Vision Systems – Security

- 3D vision
- high performance vision
- multi-camera networks



**public safety**

Open Planets Foundation  
information safety

**4 pillars for Safety & Security in the Electronic Universe**

## Facts:

- ICT systems are getting more complex – complexity however is the „natural enemy“ of security
- ICT security has to be treated holistically to be effective

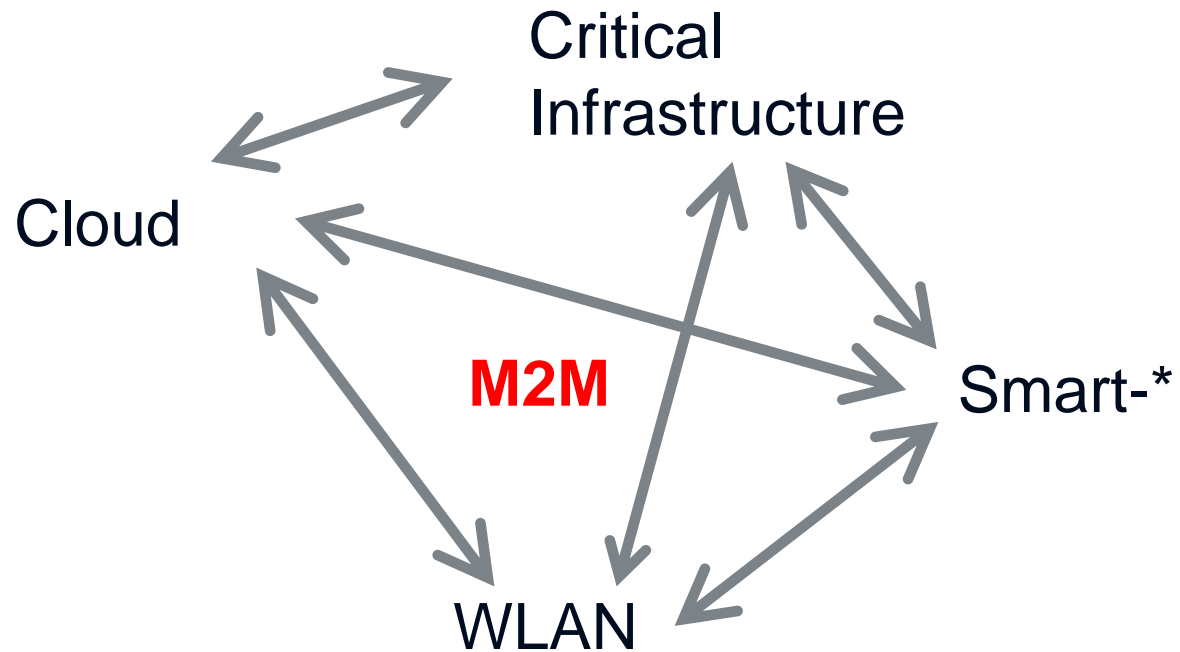


## Research goals:

- Development of methodologies and tools for Secure System Design
- Application-oriented research in the areas embedded Systems, eGovernment, Critical Infrastructures, Smart Grids, eHealth, etc.
- E.g. evaluation of MS SDL or standard RAM in M2M communication

**We are working on tools for managing the complexity of implementing efficient security mechanisms!**

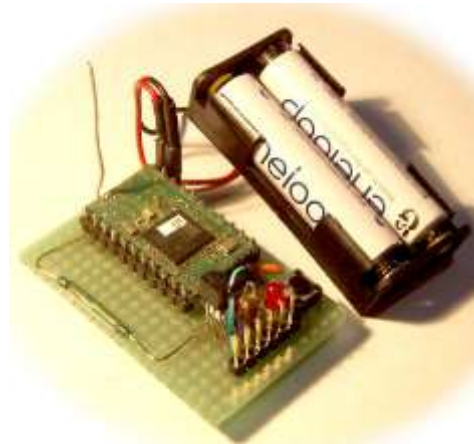
# Techn. (Application) Topics



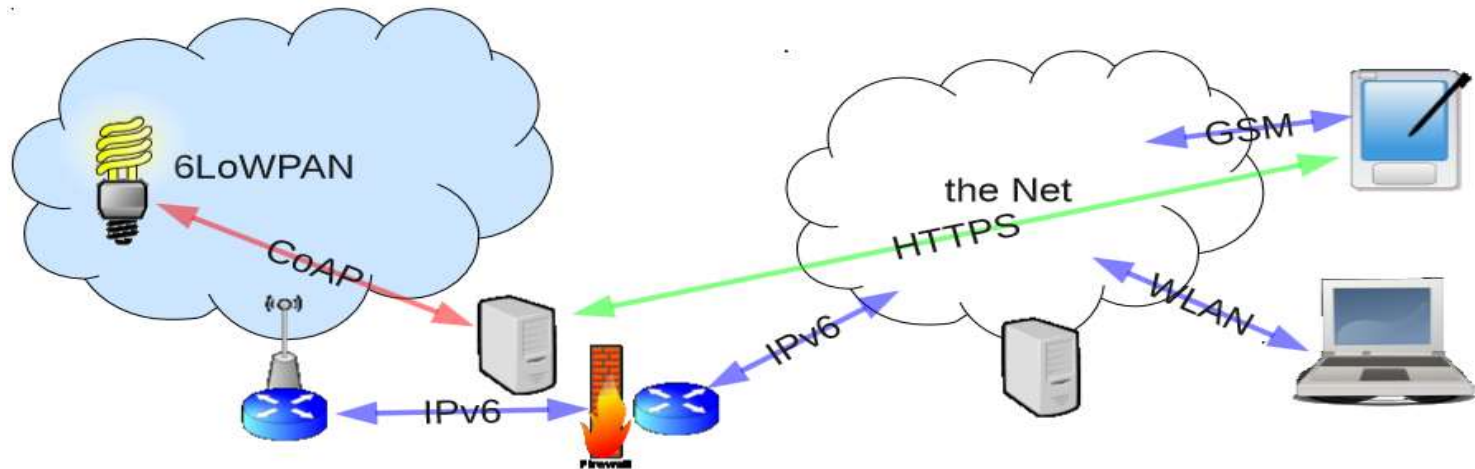
# M2M and the Cloud

Application domains:

- ATM CCTV
- Smart-Meter
- Smart-Home
- Smart-Health
- Smart-Cities
- ...



- Limited local compute capacities
- Global view required



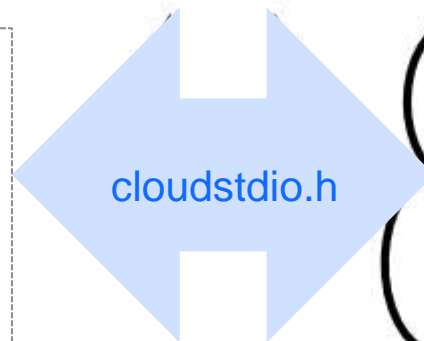
source: smekal.at

# „The Cloud“

- A Method to abstract over physical hardware

```
#include <cloudstdio.h>
#define Nbr of CPUs dynamic

main() {
  cloudprintf("Hello World ");
}
```



- Flexibility
- Scalability
- Redundancy
- Uniform Security Measures
- „Single Point of Failure“
- Origin of „Failure“ is hard to isolate (per Definition)



# Example: CCTV @ ATM & Cloud

- Search performance e.g. „**Man with red ski mask**“
- Techn. challenges due to modular architecture (Outsourcing)
- Legal challenges reg. data protection & SLA



# Example: Cloud & Mobile „Consumer“ Devices

- Google Docs
- Google Calendar
- Dropbox
- Facebook
- Folio Cloud
- *Amazon*
- „App-stores“
- *Mobile-Payment Backend*
- .....



Quelle: Cloudfimes.org

# AIT – ICT Security Projects

National and international research project examples:

- Architectural security analysis
- Risk-Management
- Data protection
- M2M, Smart-\*, Cloud, CI



**(SG)<sup>2</sup>**  
Smart Grid Security  
Guidance



**HyRiM**  
Hybrid Risk Management  
for Utility Providers





SEcure Cloud computing for CRITICAL infrastructure IT

## ■ Overview

- 10 Partner from Austria, Finland, Germany, Greece, Spain and the UK
- Project budget 4.8 Mio, partially funded by EC FP7
- Project runtime 1.1.2013 – 31.12.2015
- **User driven**



## ■ Topics

- Combination of technical and legal aspects regarding log gathering (SLA management, data protection)
- Novel risk assessment methods regarding CI & Cloud
- Understand Cloud behaviour („monitoring“, forensic analysis, anomaly detection, „root cause analysis“, „resilience“)
- Guidelines for secure operation of CI in the Cloud & „Service Assurance“
- Real life evaluation scenarios

# Smart Grid Security Guidance (SG)<sup>2</sup>



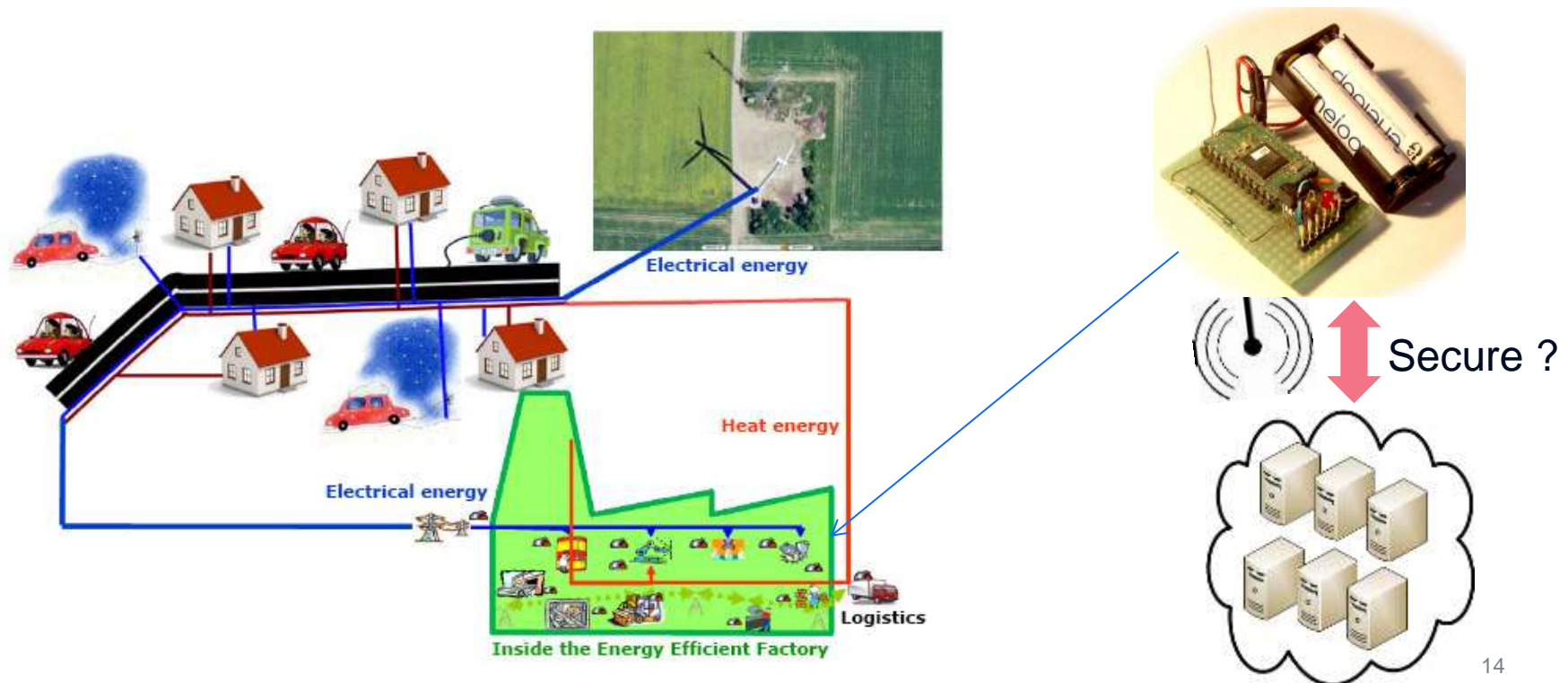
- KIRAS Project runtime 2 years, 11/2012 – 11/2014
- Smart Grid security aspects in an Austrian context
- Partner:
  - AIT Austrian Institute of Technology
  - Technische Universität Wien
  - SECConsult Unternehmensberatung GmbH
  - Siemens AG, Corporate Technology Österreich
  - LINZ STROM GmbH
  - Energie AG Oberösterreich Data GmbH
  - Innsbrucker Kommunalbetriebe AG
  - Energieinstitut an der JKU Linz GmbH
  - Bundesministerium für Inneres
  - Bundesministerium für Landesverteidigung und Sport



# Arrowhead



- Arrowhead – Improvement of efficiency and flexibility and sustainability in the industrial context via in smart-\* and e-mobility and virtual energy markets. AIT's Focus: Architectural Security Analysis
- Runtime 4 years, 78 Partner (Austrians: TU Graz, Campus 02 – FH Graz, AIT, Evolaris, AVL, Invineon)





# HyRiM: Hybrid Risk Management for Utility Providers



**HyRiM**  
Hybrid Risk Management  
for Utility Providers

- Development and evaluation of Hybrid Risk Metrics for coupled complex critical infrastructure networks
- Development of tools and methods for risk assessment for utility providers in the face of novel threads (e.g.: Advanced Persistent Threats)
- Definition of security architectures for utility providers for e.g. BYOD scenarios



# SPARKS – Smart Grid Protection Against Cyber Attacks – EU FP7

## Research Topics

- Analysing, Modelling and Simulating Smart Grid Cyber security Vulnerabilities and Threats
- Developing a Reference Security Architecture for Smart Grids
- Research and Development of Security Mechanisms and Tools
- Economic Analysis and Quantification
- Legal and Privacy Related Aspects and Policy Recommendations
- Demonstration of Project Results in Simulated and Real Testbed Environments



## Partner

- AIT, Energie-Institut Linz GmbH (AT)
- EVB - EVB Energy Solutions, a Diehl company, AISEC - Fraunhofer AISEC, IABG, SWW – Stadtwerke Wunsiedel (DE)
- KTH Kungliga Tekniska högskolan (SE)
- L+G - Landis + Gyr (CH), RSA, the Security Division of EMC (CH/IE)
- CSIT - Queen's University Belfast, Centre for Secure IT (UK) UTRC United Technologies Research Center (IE)



# User and Advisory Board (UAB)

Most AIT projects include opportunities to get involved via a UAB, which provide:

- Information in annual workshops
- Proactive information regarding research outputs
- Direct channel to researches to steer research direction

**Dr. Markus Tauber**  
Project Manager, ICT Security,  
Future Networks and Services,  
Safety & Security Department