



# Průmysl 4.0 jako příležitost pro proaktivní MSP

Tomáš Trpišovský (Plzeň, 19. dubna 2016)

# Agenda

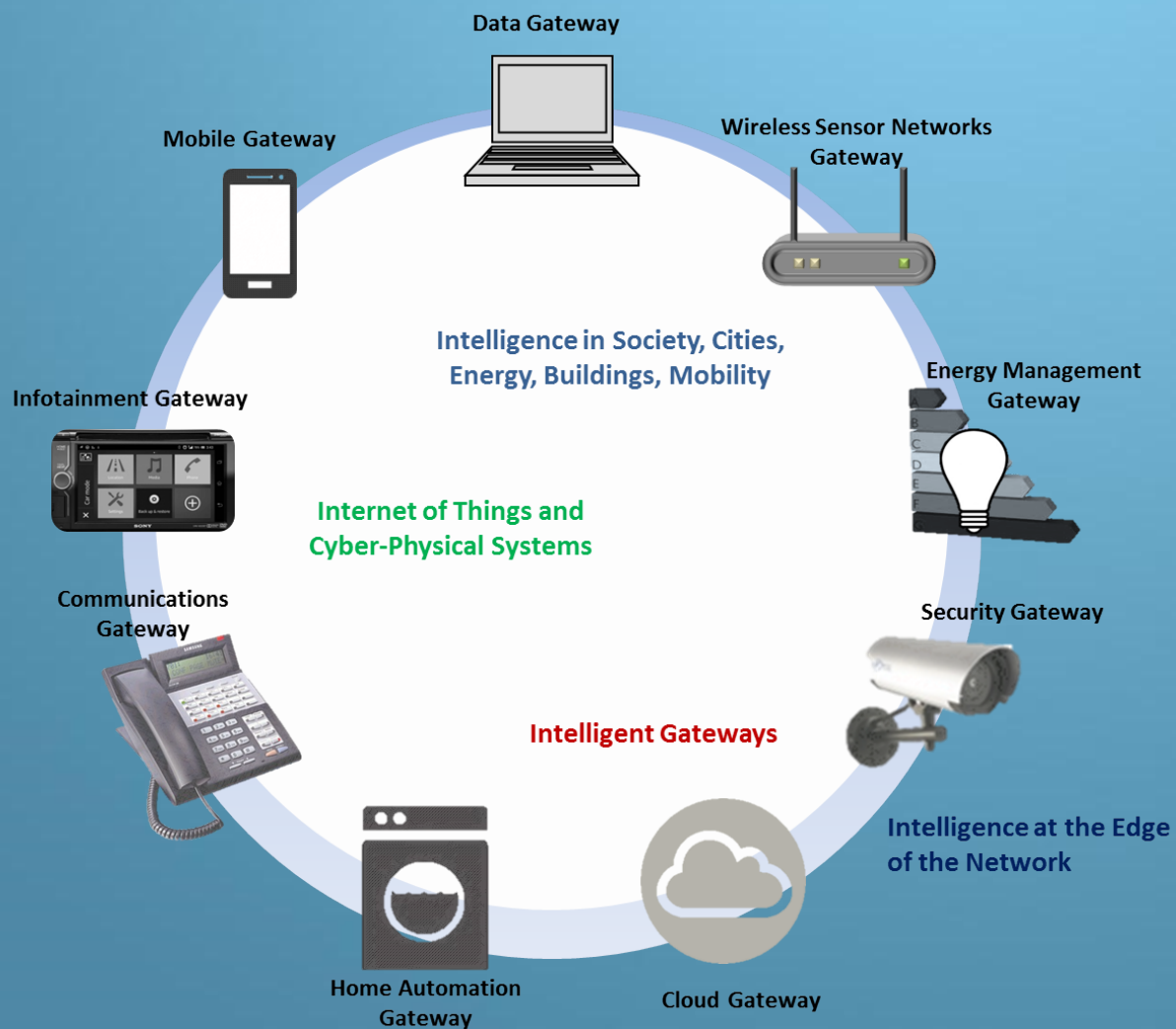


- **CPS & IoT**
- **Nanoelectronics**
- **Wireless**
- **Services (LSU, Home care)**

# Svět CPS (Cyber Physical Systems)

- Identification of humans & objects (RFID, NFC, UHF, ZigBee, Biometrics, Nano partitions)
- Lokalizace (GPS, GSM..., ZigBee, WiFi, BLE)
- Agregace dat a vytváření profilů chování → bezpečnostní politiky
- Privacy by design, Privacy by default, Opt-in / Opt-out

# Hyperconnected society





# Gateways (GALAXY Concept)

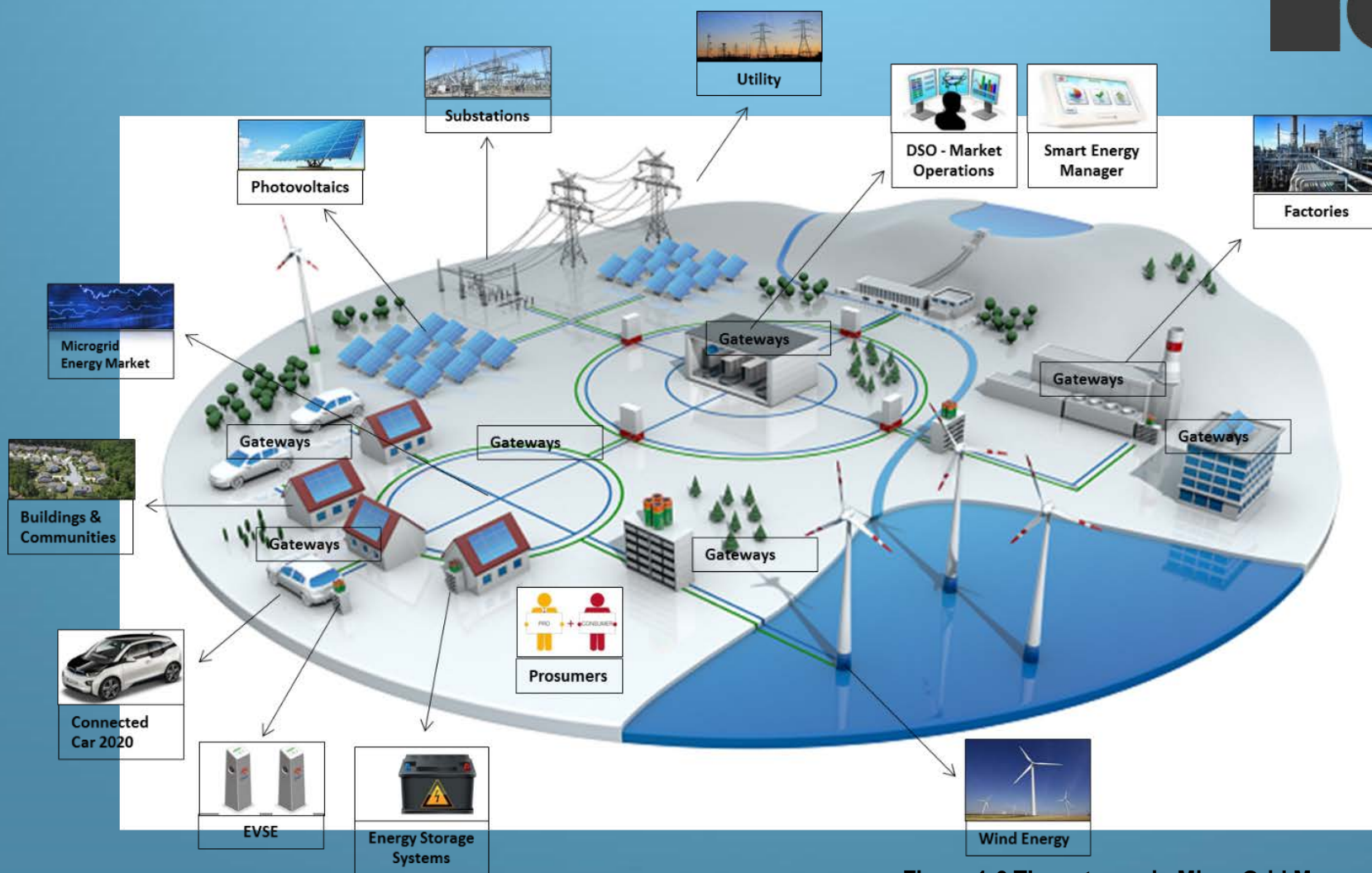


Figure 1-6 The gateway in Micro Grid Management Systems

# IoT standardisation

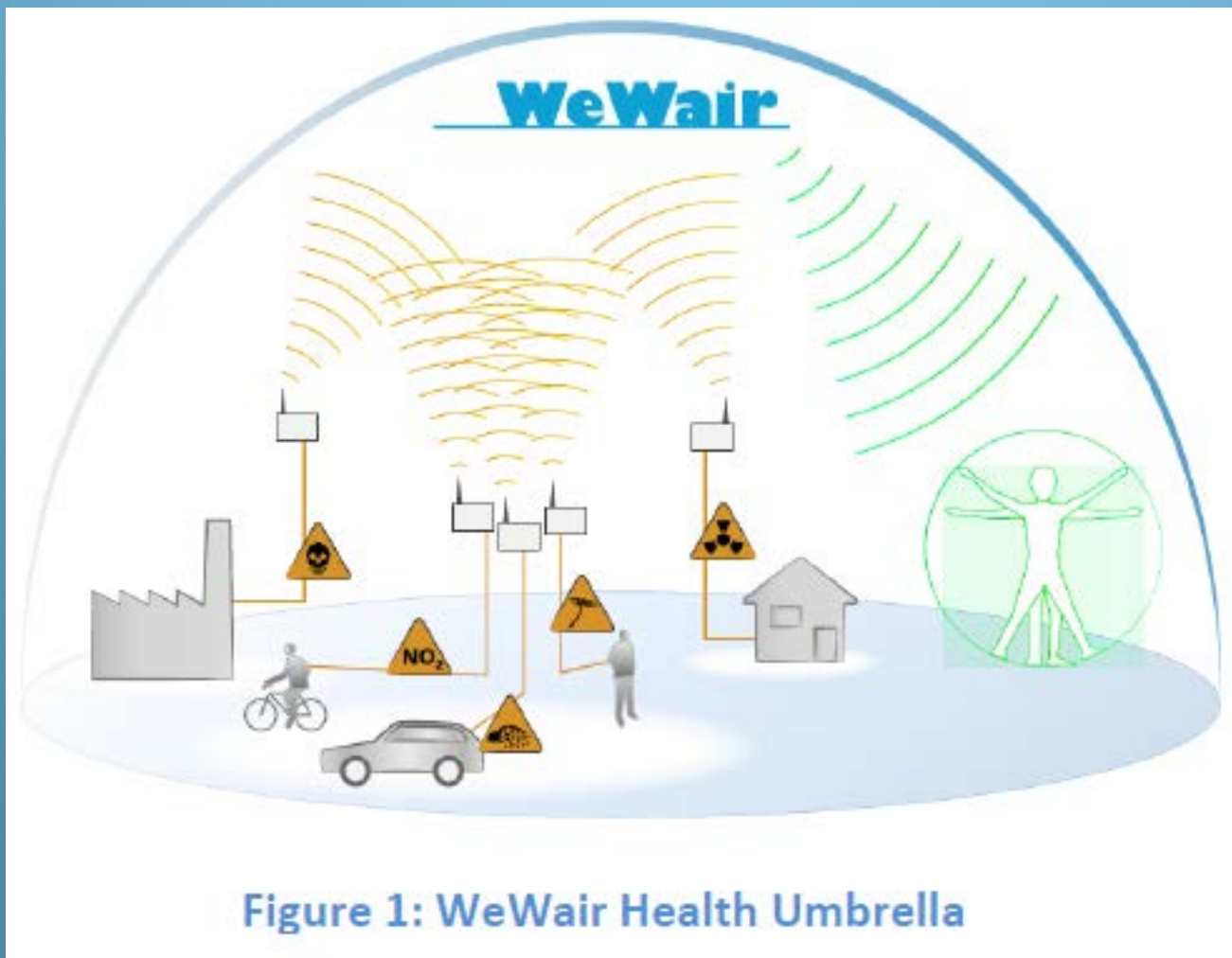
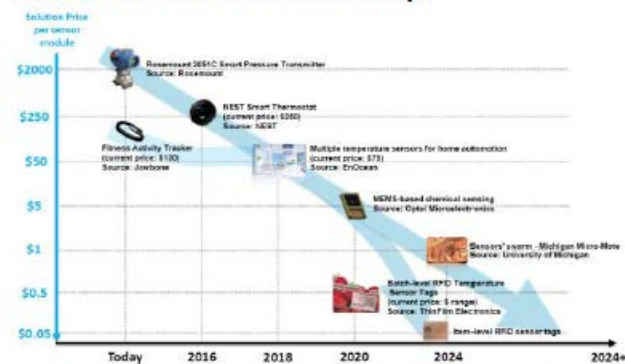


Figure 1: WeWair Health Umbrella

... and trends



## Solution Price IoT Roadmap



Source: Yole Développement 2014 – MEMS Report

Figure 19: Solution Price IoT Roadmap

## Form Factor IoT Roadmap

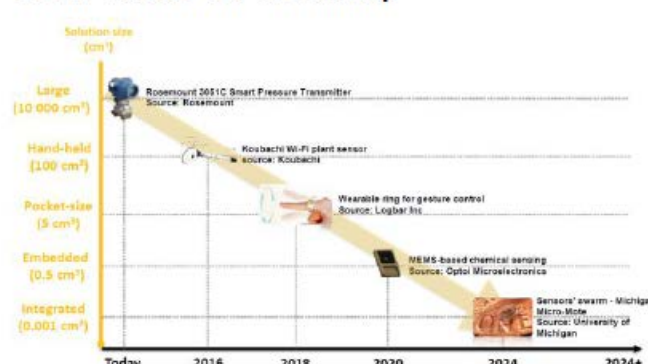
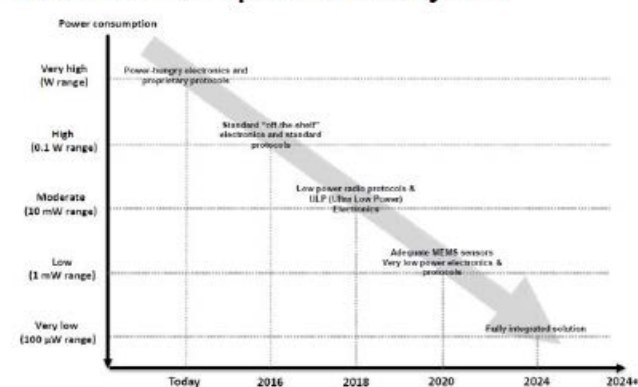


Figure 18: Form Factor IoT Roadmap

## Power Consumption / Battery Life



Source: Yole Développement 2014 – MEMS Report

Figure 21: Power Consumption / Battery Life

## Security & Privacy IoT Roadmap

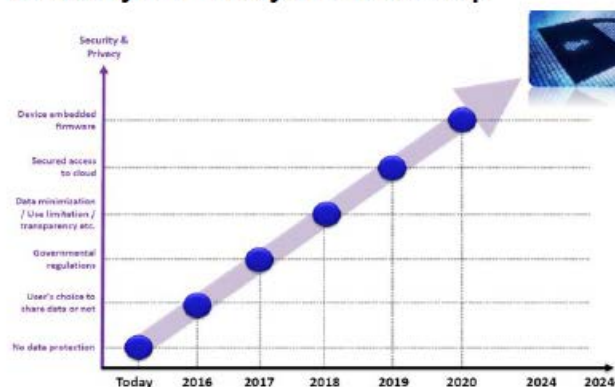


Figure 20: Security & Privacy IoT Roadmap



# examples

Chirurgie FNKV Praha  
ZigBee  
lokalizace  
pacientů



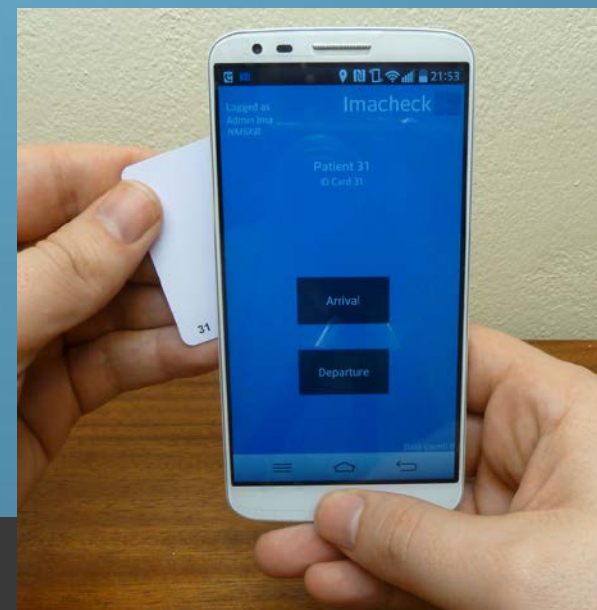
NETME / VUT Brno – UHF  
identifikace prádla



ASTERICS construction set EU



NMSKB Praha - NFC  
Domácí péče  
+ Dryak + PUMA

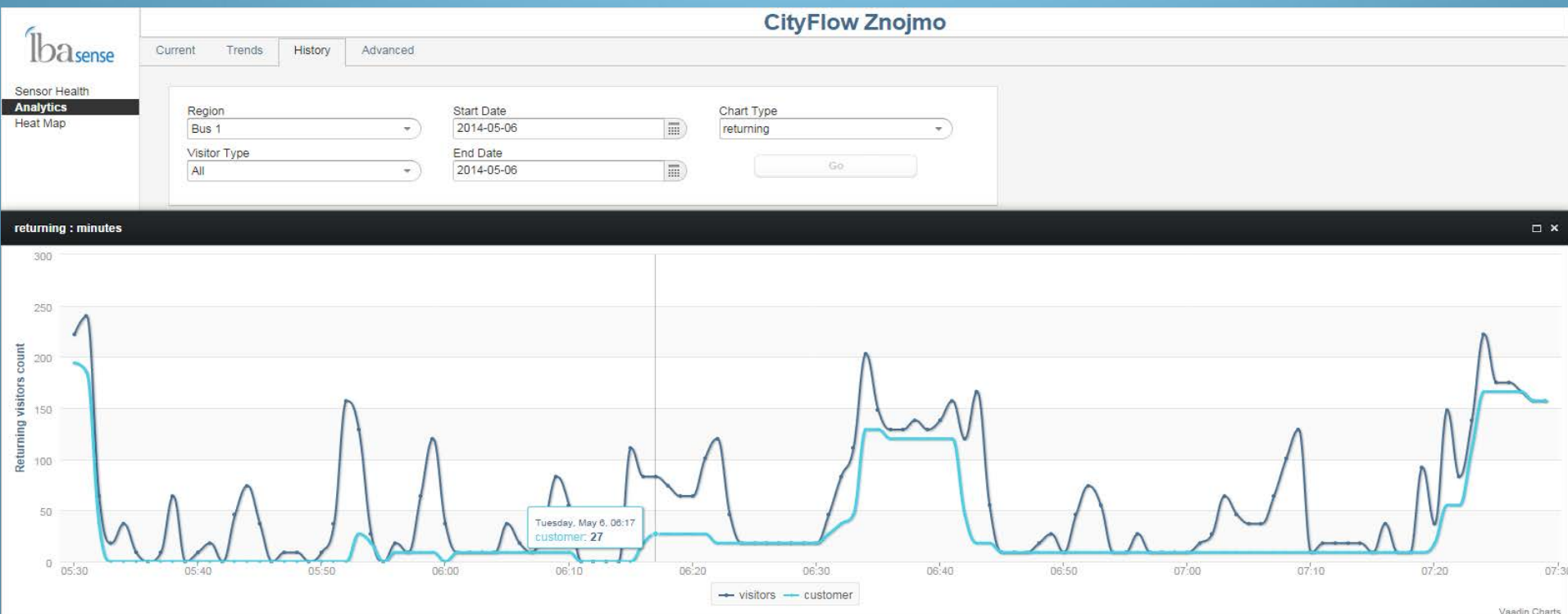




# Zajímá nás obsazenost autobusu ve Znojmě? (profil chování – koho a proč to zajímá??)



- Customers of ČAS Znojmo travelling in bus



# CPS & IoT Exploitation

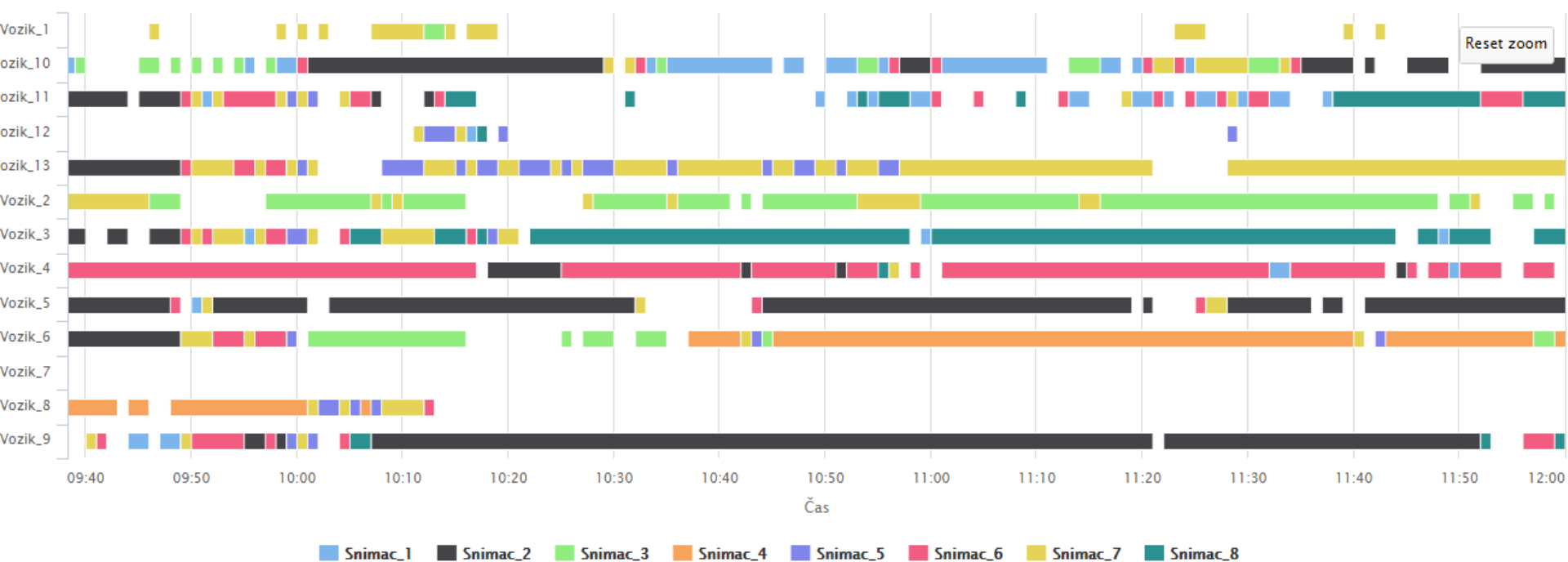


- Access control / ID in correlation with object localization -> asset management
- Sensor data acquisition
- DATA MINING in parallel with Privacy protection
- **Cost effective innovation & maintenance of critical infrastructure (Hastings cocept)**

# Objects tracking



Carts operation in zones Chart



# Agenda



- CPS & IoT
- **Nanoelectronics (if not dangerous?)**
- Wireless
- Services (LSU, Home care)



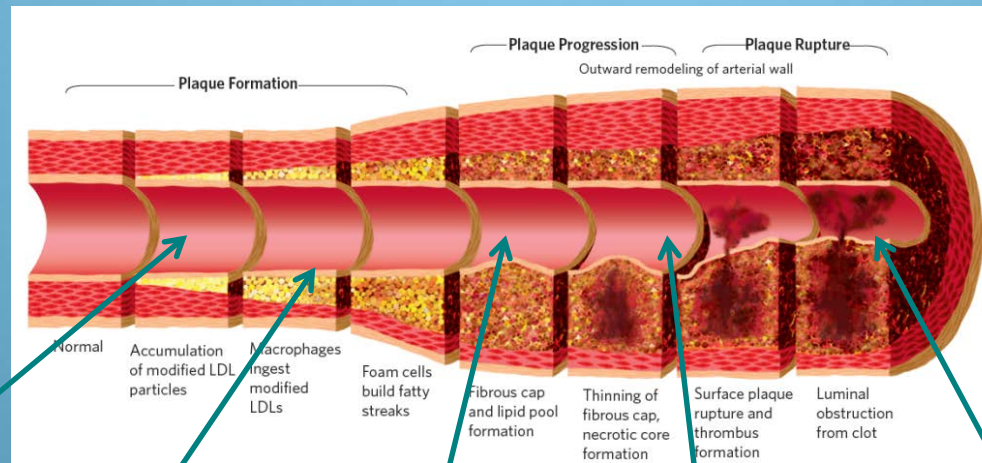
# Nano fibres



- Elmarco CZ
- 1 nm fiber with built-in partitions
- (versus 10 nm Intel 3D chips)
- Sensors
- SoC, MEMS



# Nano fibres



**Emergency**



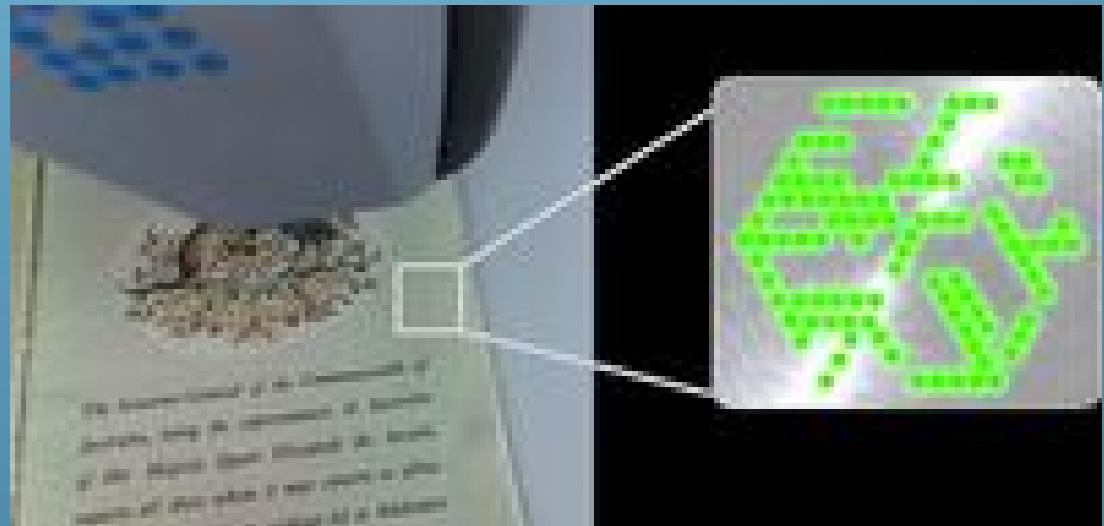
Prognosis : poor development and early death

Source: Philips Healthcare

# Nano partitions, fibres exploitation



- Nano sensors – MEMS
- Nano-id ??
- Unique id
- Encryption

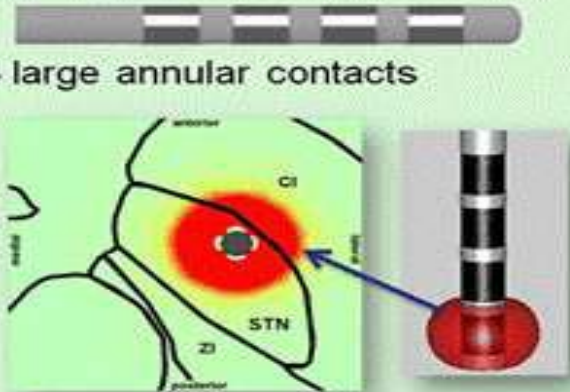




# ECSEL DeNeCoR – innovation

DeNeCoR will improve the number of brain interfaces in deep brain stimulators

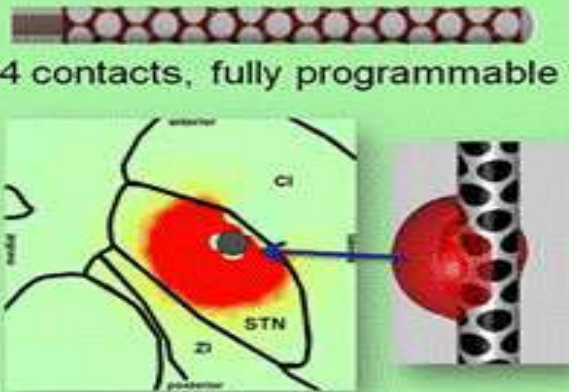
### State-of-the-Art



4 large annular contacts


Stimulation-leakage outside the target induces side-effects

### DeNeCor Innovation



64 contacts, fully programmable

Steering can prevent side-effects and increase therapeutic window (proven in preclinical stage)



Transcranial magnetic stimulation



# Nano World



- Critical infrastructure
- Security vs. Maintenance and upgrade
- Embedded Testing Instruments ETI

# Agenda



- Power electronics
- CPS & IoT
- Nanoelectronics
- **Wireless**
- Services (LSU, Home care)

# CORTIF

## Coexistence Of RF Transmissions In the Future

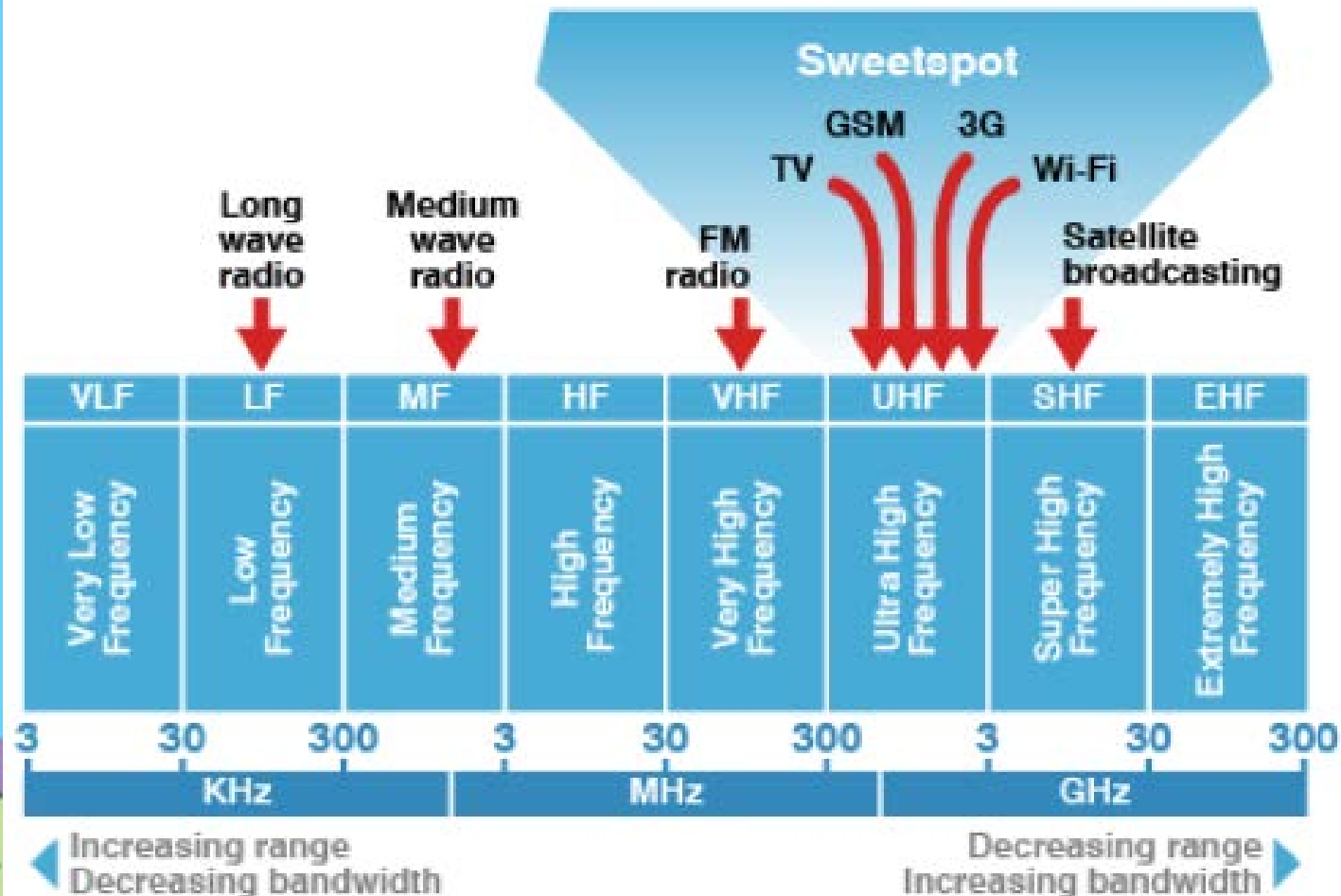
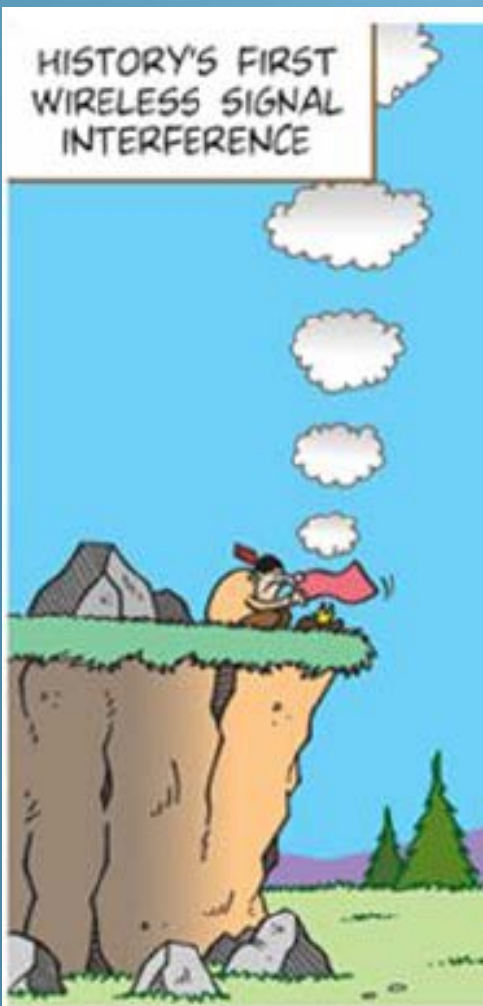
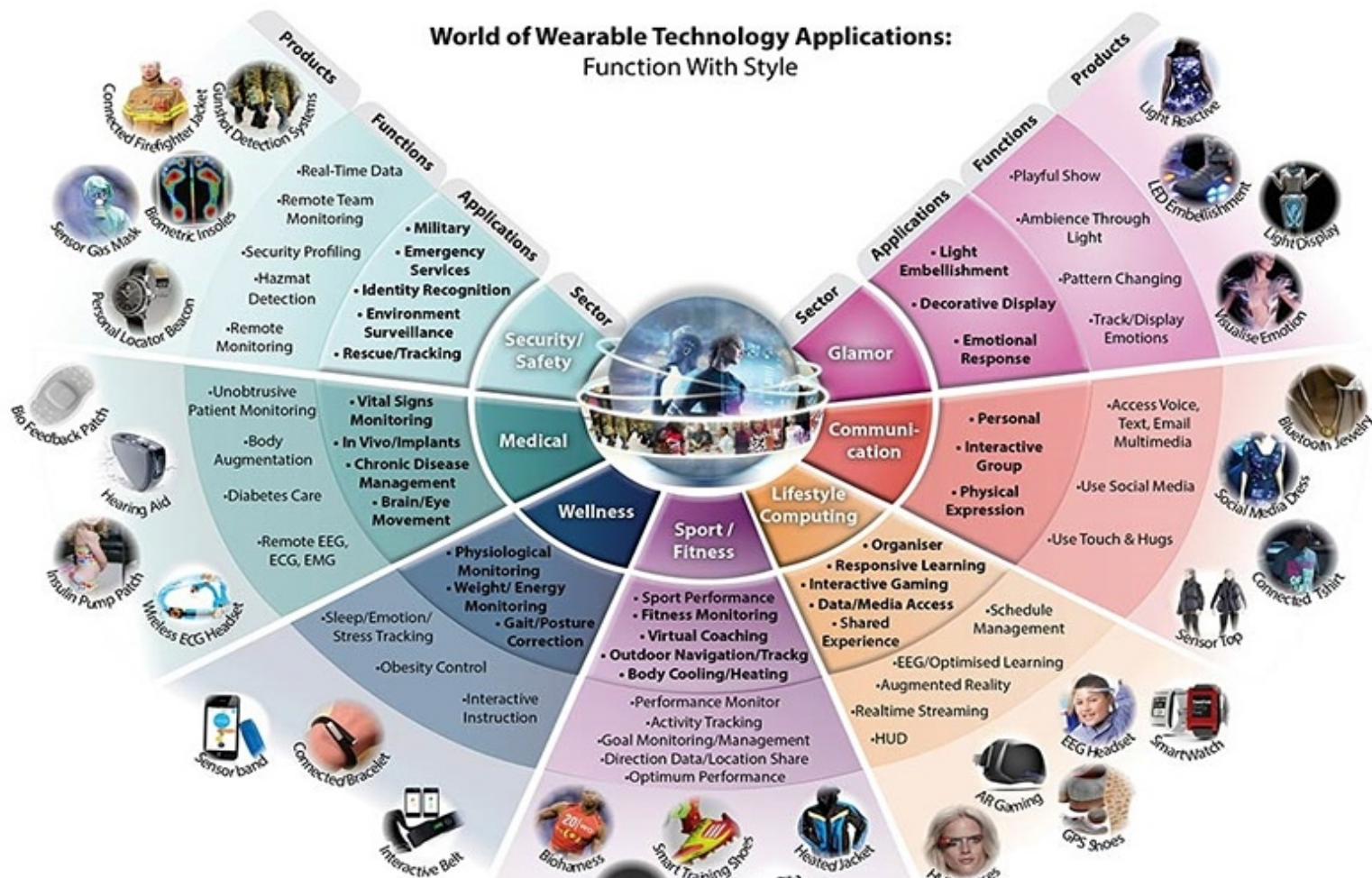


Figure 2 - Frequency allocation

# H2O Human to Objects

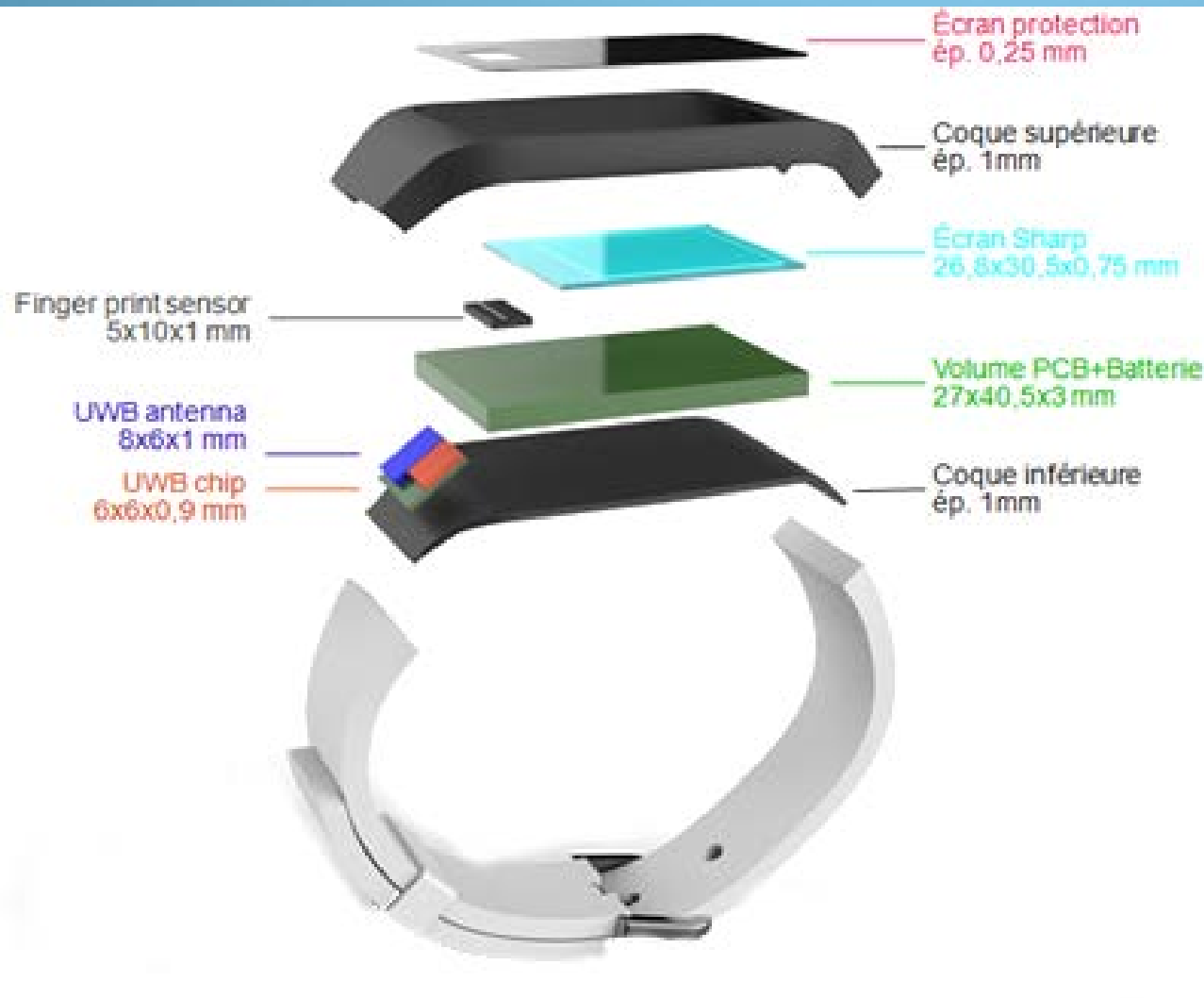
## “Easy Interactions in the Smart City”



Source: Beecham Research



# Wearables



- eGO
- H2O

# Wireless Exploitation



- eGo – H2O identifier
- IMA RSW readers (RFID, NFC, BLE)
- Wireless sensors (ZigBee, LP WAN)

# Agenda



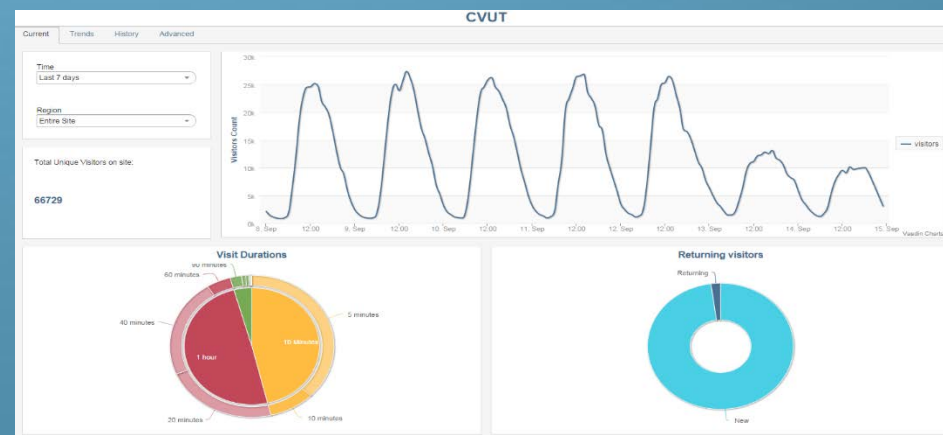
- Power electronics
- CPS & IoT
- Nanoelectronics
- Wireless
- **Services**

# Large Scale UMTS Location Based Service



## Goal & Implementation:

- LBA UTMS sensor
- LBAsense mobility API
- Data acquisition server
- Generic data analyser
- Data2application API



# Envisioned LSU pilot sites



- Development and testing site at IMA HQ
- Real-life and load testing site at CVUT (35.000+ active users)
- Industrial site in North Bohemian coalmine / ČEZ





# Home Care

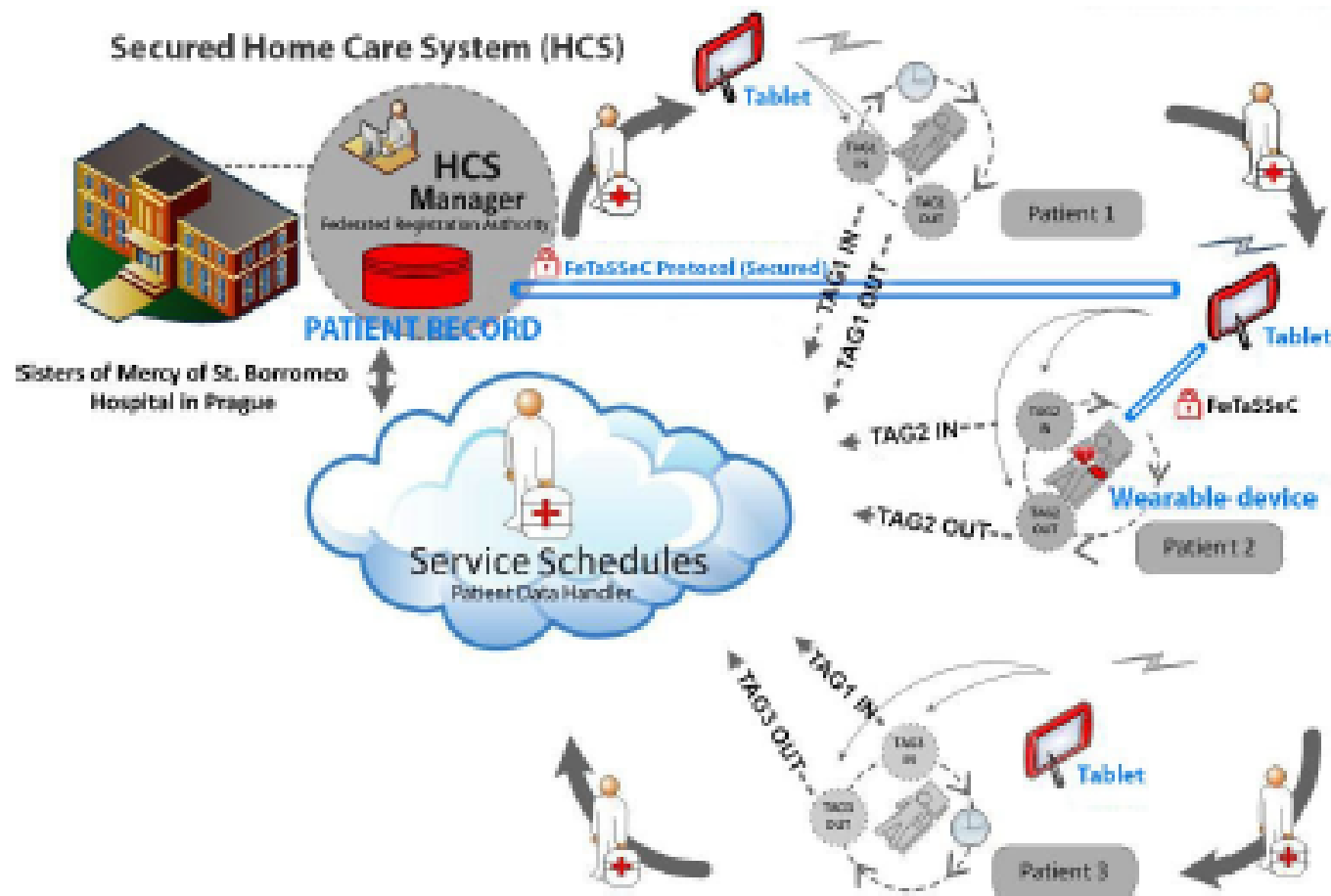
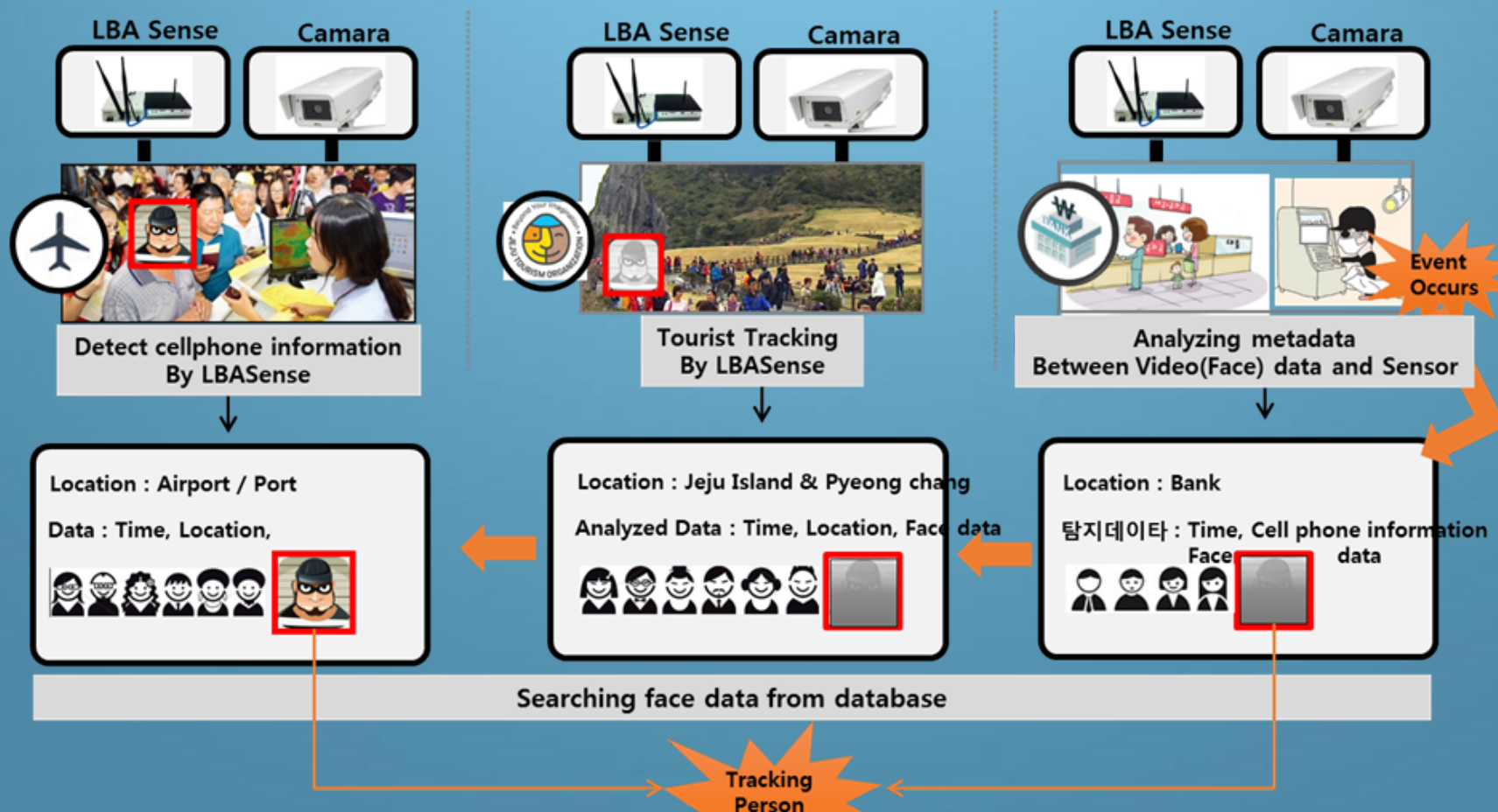


Figure 5: New Secured Home Care System (After Applying FeTaSSeC)

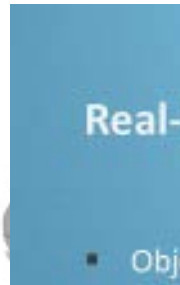
# Eurostars Face2Phone - security



## SERVICE CONCEPT : Scenario



# Červená nit know-how



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OEMs:  
e.g. Google Wallet

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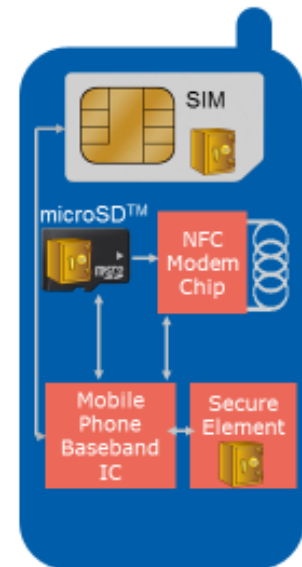
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RSW04 IMA

of trust



Future: mobile platform with  
multiple roots of trust



Příjemný den

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