



# TETRA COM: Technology Transfer in Computing Systems



FP7 Coordination and Support Action to fund 50 technology transfer projects (TTP) in computing systems. This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement n°609491.

## Flexible ultra-low-power and easy-to-use WSN

Christian Weis, Carl C. Rheinländer, Norbert Wehn, University of Kaiserslautern, Germany  
Sebastian Wille, Asandoo GmbH, Germany

### TTP Problem

#### Challenges with existing Beacons

One solution are so-called **Beacons**; small senders based on Bluetooth Low Energy; they can be used by mobile devices for indoor localization.

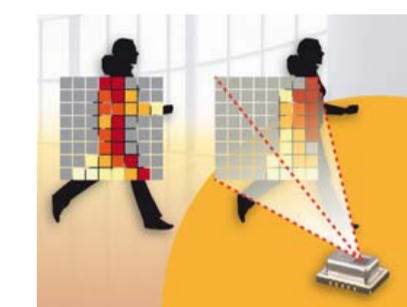
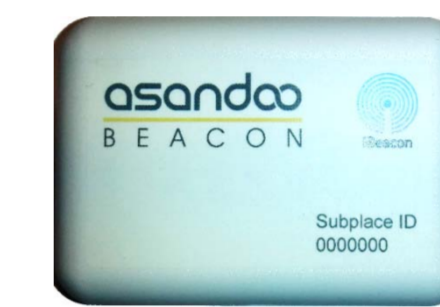


- **Limited possibilities** / no environment sensors
- Apps need a **special SDK**
- Needs **Bluetooth**
- **Not every person** has a mobile device in the pocket
- Beacons **cannot communicate** to the cloud directly
- Beacons **are not interconnected** to each other

#### Extended Requirements

#### Availability of a Beacon combined with special sensors !

- Add **special sensors** allowing collecting of data
- Enable a **connection** from Beacon to **Cloud** via Gateways
- **Interconnect Beacons** among each other
- **Flexible and Ultra-Low-Power** design
- **Easy-to-use** – Layer-based embedded software



### TTP Solution

#### Create



with the existing know-how of flexible WSNs at the University of Kaiserslautern a new extended Beacon to enable

new business at Asandoo GmbH.

#### "Expertise" of the University

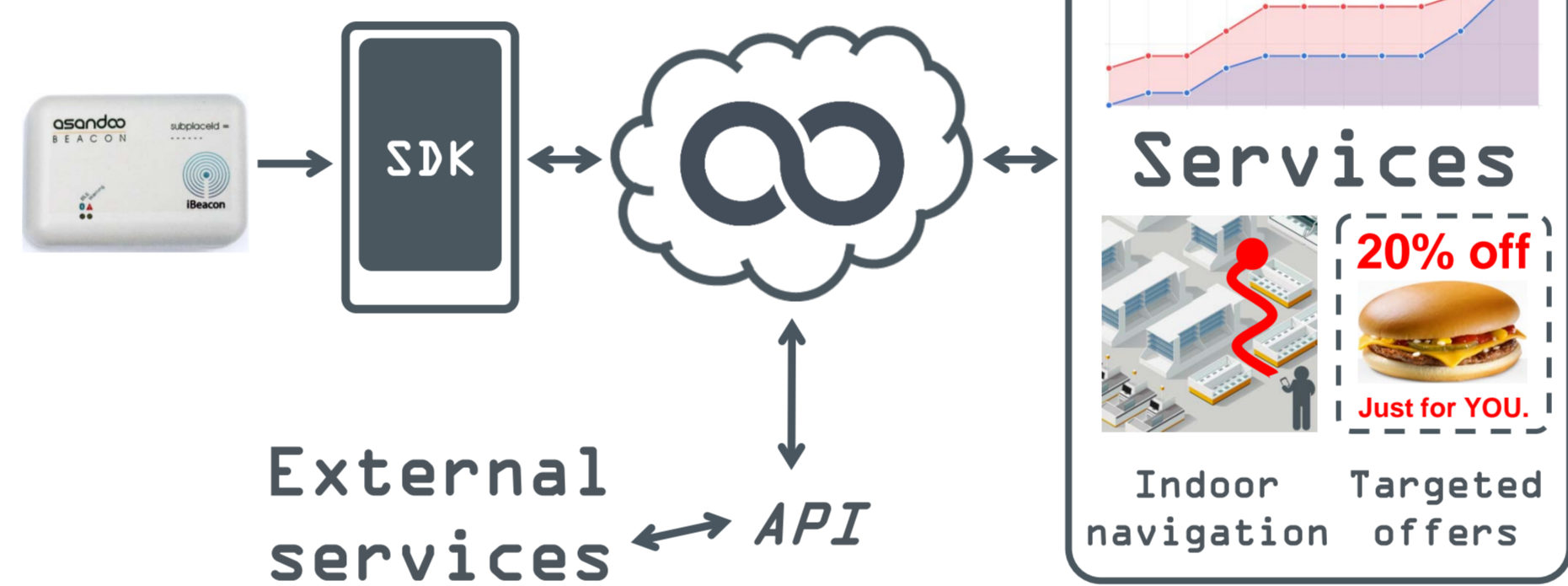
"The Microelectronic Systems Design Research Group has more than 200MY experience in communications systems (including wireless communications, coding standards, MIMO systems) and has a very high scientific reputation in this field. The group is also member of Landesforschungsschwerpunkt AmSys since 2008, which is focused on assisting systems based on advanced low-power Wireless Sensor Networks."

<http://ems.eit.uni-kl.de>  
<http://www.eit.uni-kl.de/AmSys/index.php?ID=start&L=en&NAV=0>

**asandoo**  
makes Places smart.

- Asandoo is a full-service provider for Analytics Solution for Stores, Malls, Trade fairs, etc.
- Focus is on self designed embedded hardware/software, installation and Cloud services.

[www.asandoo.com](http://www.asandoo.com)

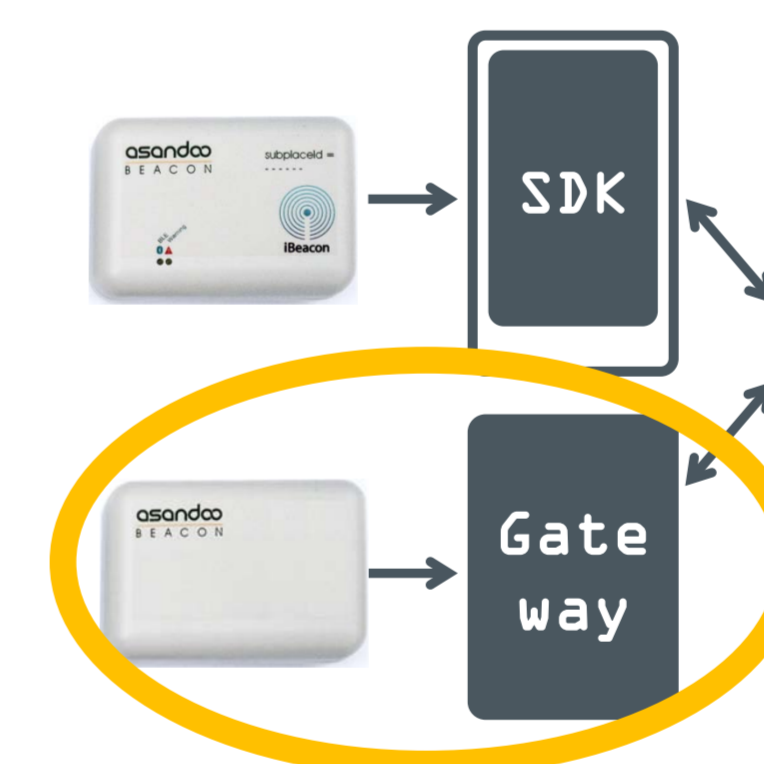


Cooperation & know-how exchange

- "Expertise"
- MICROELECTRONIC SYSTEMS DESIGN
- RESEARCH GROUP

**asandoo**  
Know-how in Beacon technology and Cloud services

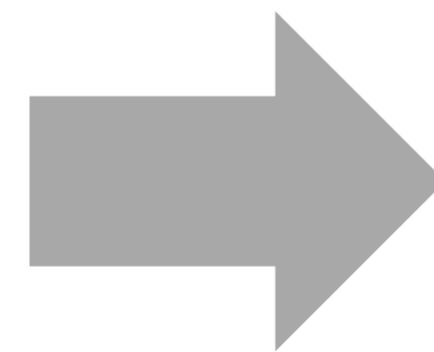
Combine Beacon and Flexible WSN node



New sensor / gateway technology External services

### TTP Impact

- **Extend existing Analytics services** with enhanced Beacon with flexible WSN.
- **Outstanding hardware implementation** efficiency (power consumption of embedded hardware, flexibility, new sensors) that enables lower customer maintenance costs and deeper insights.
- **Acquire new customers** in existing market segments; an example is the extension of the Beacon technology to penetrate the market segment of market researchers (midterm view).
- **Develop new market segments** to broaden the portfolio by creating new Internet of Things products, for instance in the Quantified Self/Assisted Training market (long term view).
- The **visibility of the company** is increased, esp. for students (future candidates to be hired).



This enabled **asandoo** as a small start-up to do already **three** large installations:

#### UAE, Dubai

- 8,000 m<sup>2</sup> Flagship store
- 7 stores at all

#### DE, Kaiserslautern

- Smart Campus
- 500 Beacons
- 25,000 m<sup>2</sup>

#### DE, Frankfurt

- IAA 2015
- Individual Tours
- Indoor localization



### TTP Facts

Contact: Christian Weis  
E-mail: [weis@eit.uni-kl.de](mailto:weis@eit.uni-kl.de)  
TETRA COM contribution: 22344 €  
Duration: 01/05/2015 - 30/09/2015

**asandoo**  
Asandoo GmbH, [info@asandoo.com](mailto:info@asandoo.com)

**TECHNISCHE UNIVERSITÄT KAISERSLAUTERN**