FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITY OF WEST BOHEMIA

RICE

Faculty of Electrical Engineering
University of West Bohemia
Pilsen, Czech Republic
Department of Materials and Technology

IoT projects and possibilities of cooperation with the university

IQRF Meetup Praha, 15. 9. 2021

doc. Ing. Tomáš Blecha, Ph.D.
R&D Senior Project Manager

Ing. et Ing. **Petr KAŠPAR**, Ph.D.
Head of SmartCity & IoT group

www.rice.zcu.cz

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Smart City & Internet of Things Group

SmartCAMPUS UWB | Future Concept

smart CAMPUS

- microcosm of a city
- living laboratory
- test polygon

01. Parking
02. Parking
03. Caffeteria
04. Bibliobox
05. Scooters
06. Benches
07. Lecture Halls
08. Café
09. Informational Panel
10. Smart Bin
11. Weather Station
12. Sport Field
13. Sport Hall
14. Charging Station
15. Charging Kiosk
16. LoRaWAN Gateway

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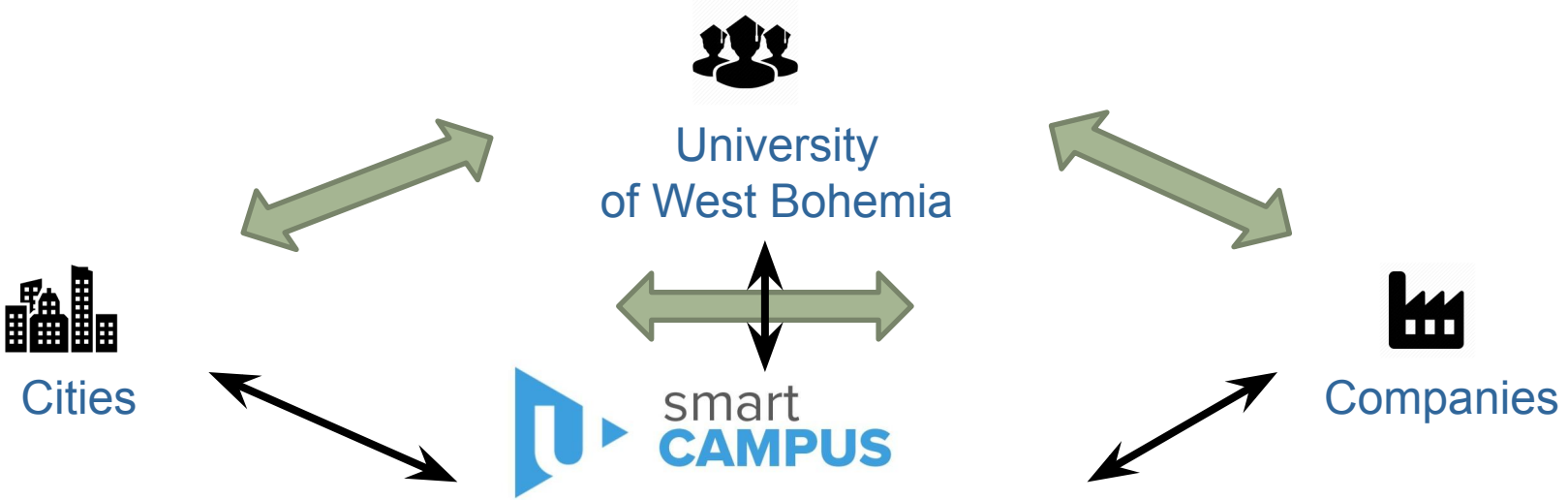
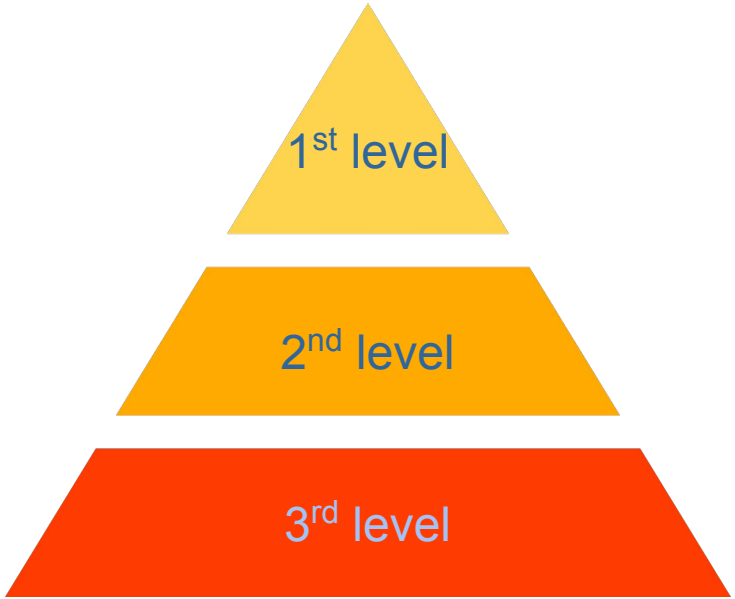
SmartCAMPUS UWB | Opportunities For All



Smart Campus UWB

Organisation structure across the UWB



Top University Organisation Level
- 9 faculties
- 4 research institutes
- 3+ other organizational units

Faculty Organisation Level
- departments at each faculty

Department Organisation Level
- workgroups under departments

Smart Campus UWB

WORKGROUPS under SmartCampus:

- ICT infrastructure and sensors
- Smart Parking
- Mapping and navigation
- OpenData and standards
- Energy and savings
- Marketing and communication

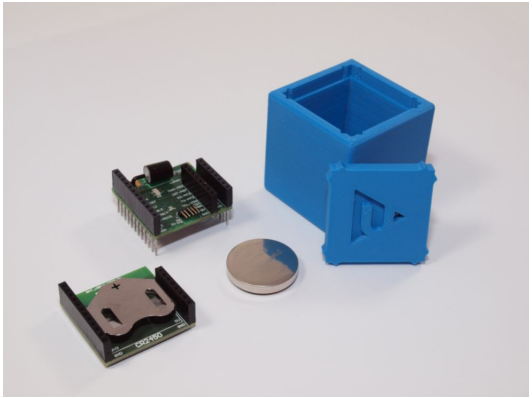
Smart Campus UWB

KETCube - IoT platform for rapid developing

- New and open prototyping and demo IoT platform developed at the Department of Technologies and Measurement (KET), University of West Bohemia in Pilsen.

Main features:

- Supported Frequencies: 868MHz, 915MHz
- Radio: LoRaWAN, Sigfox, Proprietary P2P
- Interfaces: UART, SPI, I2C, ADC, DAC, PWM, GPIO
- mikroBUS compatible pinout, custom KETCube pinout
- Key circuits: Murata ABZ..., TI HDC1080 (T, RH)
- Battery: Panasonic CR-2450/BN (620 mAh)
- Recommended Antenna: ANT-868-JJB-RA



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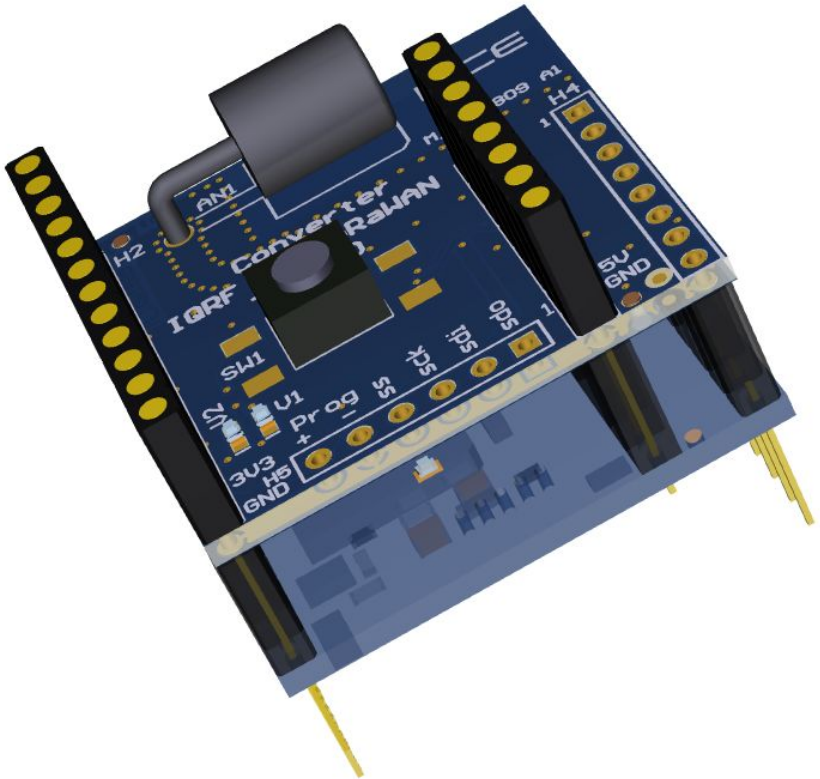
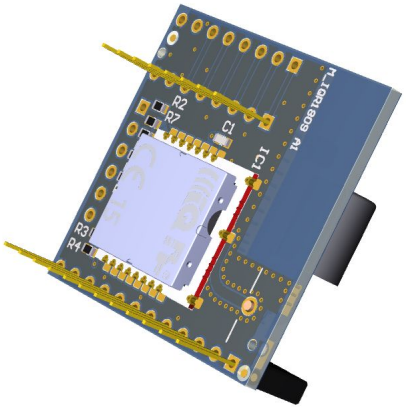
IQRF connectivity for KETCube

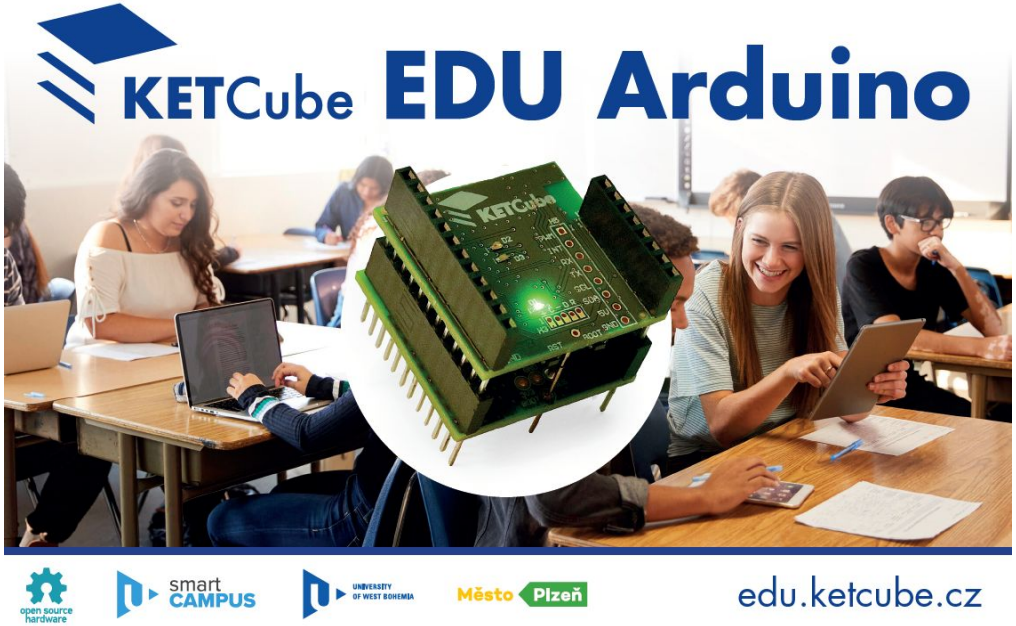
Based on TR-76D



- 2x LED
- 1x SW
- antenna



KETCube EDU Arduino



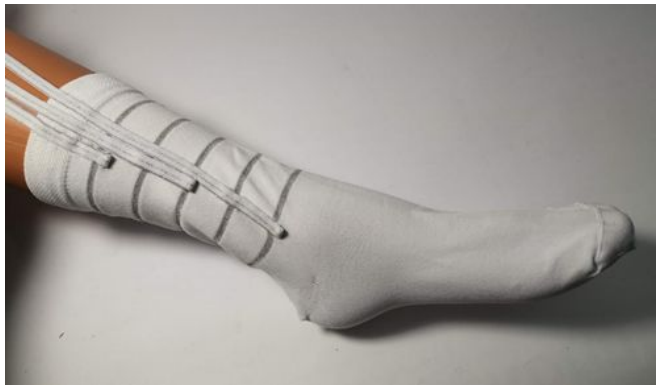
- integrated into Arduino IDE
- open HW and SW
- direct IoT connection
- low power
- czech platform for IoT
- many peripherals
- modern & mini design

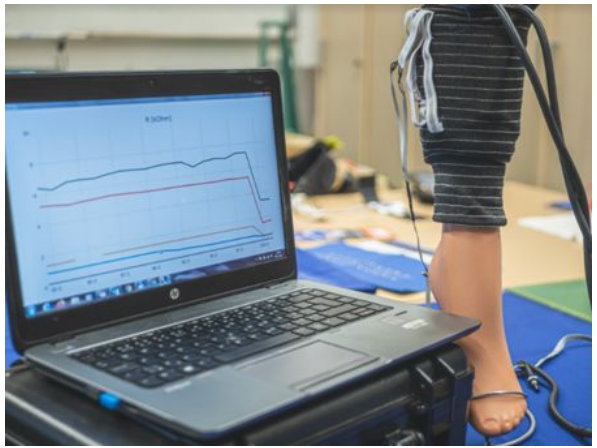
KETCube EDU Arduino will come to schools soon !

Smart Socks

Knitted socks for monitoring of patients with edema

- Seamless integration of sensor threads into knitted structure
- Developed strain sensor thread based on stappled stainless steel fibers
- Changes in the electrical resistance of the sensor due to changes in limb swelling
- Data wirelessly transferred to the cloud storage using IoT technology for further processing

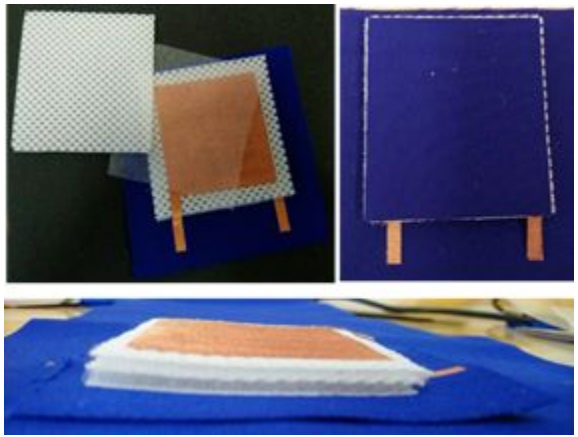


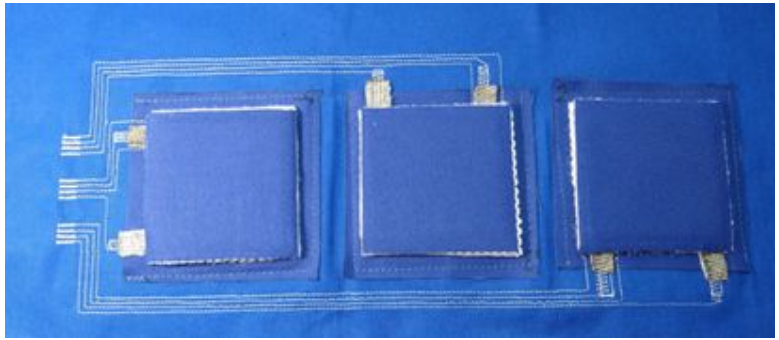


Textile Pressure Sensors

Textile pressure sensor system for measuring swelling or pressure therapy for problems with leg ulcers

- Textile capacitors used as pressure sensors
- Data transferred via IoT network to web application
- Long-term monitoring
- Warning when limit states exceeded
- Remote patient monitoring





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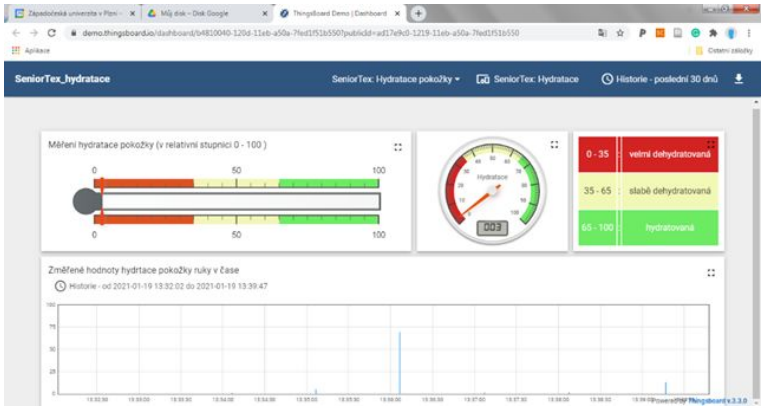
Skin Hydration Measurement

Textile sensor for long-term monitoring of skin hydration

- Data transferred and stored in cloud storage using IoT technology
- Data visualization directly in a web browser. Possibility of a risky condition warning
- A completely new solution for long-term monitoring of skin hydration



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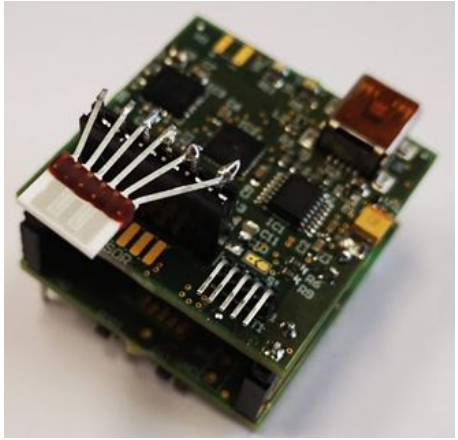
Gas sensors

Hazardous gas detection system - NH_3, CO_2, CH_4

- Sensors based on modified carbon nanotubes
- Modular system - interconnection, easily interchangeable
  - Module of measuring and evaluation circuits
  - Communication circuit module (LoRa, IQRF)
  - Power supply module
- The dimensions of the electronic system do not exceed 32 x 32 x 32 mm



IoT sensor for explosive environment

(ATEX)

Main features:

- Temperature, flow, pressure, digital IO
- monitoring of gas distribution stations
- ATEX certification in progress
- **IQRF**, Wireless modbus, NB

Cooperation ZČU FEL RICE / ZAT a.s.

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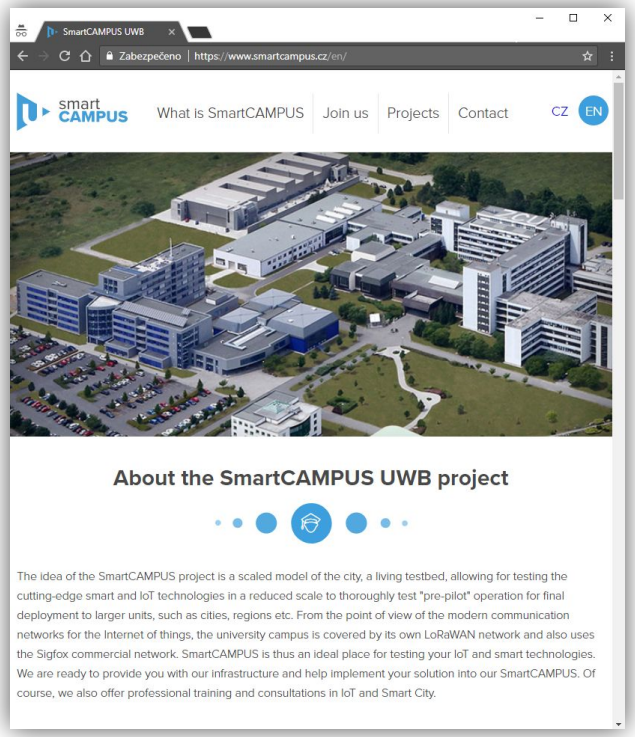

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Contact
Ing. et Ing. Petr Kašpar, Ph.D.
petrx@fel.zcu.cz