

Development of Monitoring Systems Based on IQRF Technology at the Department of Cybernetics and Biomedical Engineering

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VSB TECHNICALFACULTY OF ELECTRICALDEPARTMENT OF CYBERNETICSIIIIUNIVERSITYENGINEERING AND COMPUTERAND BIOMEDICAL ENGINEERINGOF OSTRAVASCIENCESCIENCEAND BIOMEDICAL ENGINEERING
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Who we are

- VSB-Technical University of Ostrava, FEECS, Department of Cybernetics and Biomedical Engineering (CBE VSB-TUO)
- CBE is the 2nd largest department in FEECS with ~50 employees and ~200 students in all programs

What we do (our group)

- Teaching; R&D in wireless sensors, wireless measurement systems, data processing and visualization, all based on IQRF platform
- Cooperation with significant companies in the geotechnical field (Strix Chomutov a.s., SG-Geotechnika a.s., Straub, s.r.o.)
- On association with IQRF technology
 - thermal processes monitoring on mining dumps
 - R&D in monitoring of the states of the retaining networks and dynamic barriers

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IQRF nodes

UNIVERSITY

OF OSTRAVA

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- Load anchor cell node (Wheatstone bridge)
- Accelerometric node
- Temperature nodes (1-wire, Pt100, K thermocouple)
- DC current 0 20 mA
- RMCD (CO₂, temperature, humidity, pressure)
- Gas koncentration nodes









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RMCD

- Monitoring the air quality in the classes and laboratories at the high school in Frenštát p. R.
- Monitored quantities: CO₂, temperature, humidity, pressure (opt.).
- 40 sensors in the two buildings.





Measuring the retaining steel nets and barriers

- Ministry of Industry and Trade (Strix Chomutov, a.s.)
- Several types of developed nodes.
- A few pilot installations.

Jeseníky mountains – near the Dlouhé Stráně PVE

- The first type of sensor.
- Use of accelerometer and gyroscope sensors for monitoring the state of steel nets.







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Málkov – testing area

- 5 own developed sensors were installed
- The aim: To test robustness and lifetime of monitoring system
- MESH network + GSM gateway
- Refresh rate each ½ hour
- Visualization in Grafana







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Mokré lazce

- Ministry of Industry and Trade (SG-Geotechnika, a.s.)
- Own developed sensors were installed
- Measuring the slope shift at the load anchor cells along the motorway
- The aim: to monitor the traffic safety
- MESH network + GSM gateway
- Refresh rate 6 times per day, Visualization in Grafana







Measuring the methane concentration in Radvanice

- Own developed sensor with FIS3031 calibrated sensor
- The aim: To test alarm states
- 1 sensor sends data via GSM gateway
- Refresh rate each 5 minutes
- Visualization in Grafana





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Students projects

- Dustiness sensor bachelor thesis
- IQRF/Wi-Fi gateway diploma thesis





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Future work

- Development an IQRF gateway for outdoor use with GSM or NB-IoT connection to the internet
- Focusing on the alarm states in the own developed nodes
- Cooperation with the industry partners in the are of geotechnical and environmental measurement based on IQRF technology



Thank you for your attention

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